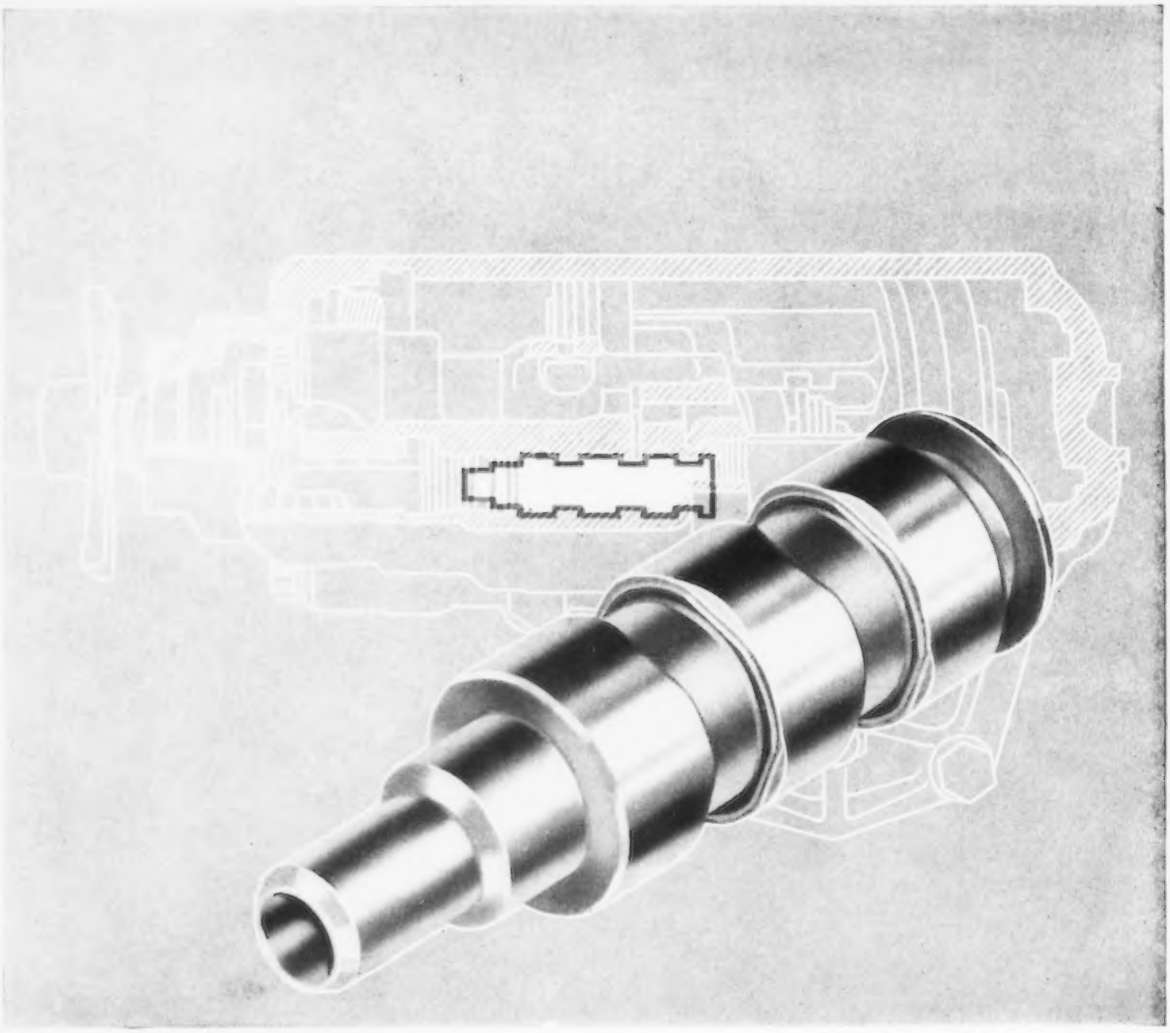
The IRON AGE
December 5, 1957 A Chilton Publication The National Metalworking Weekly

Do Meteorites Hold the Answer To Space Travel? P. 131



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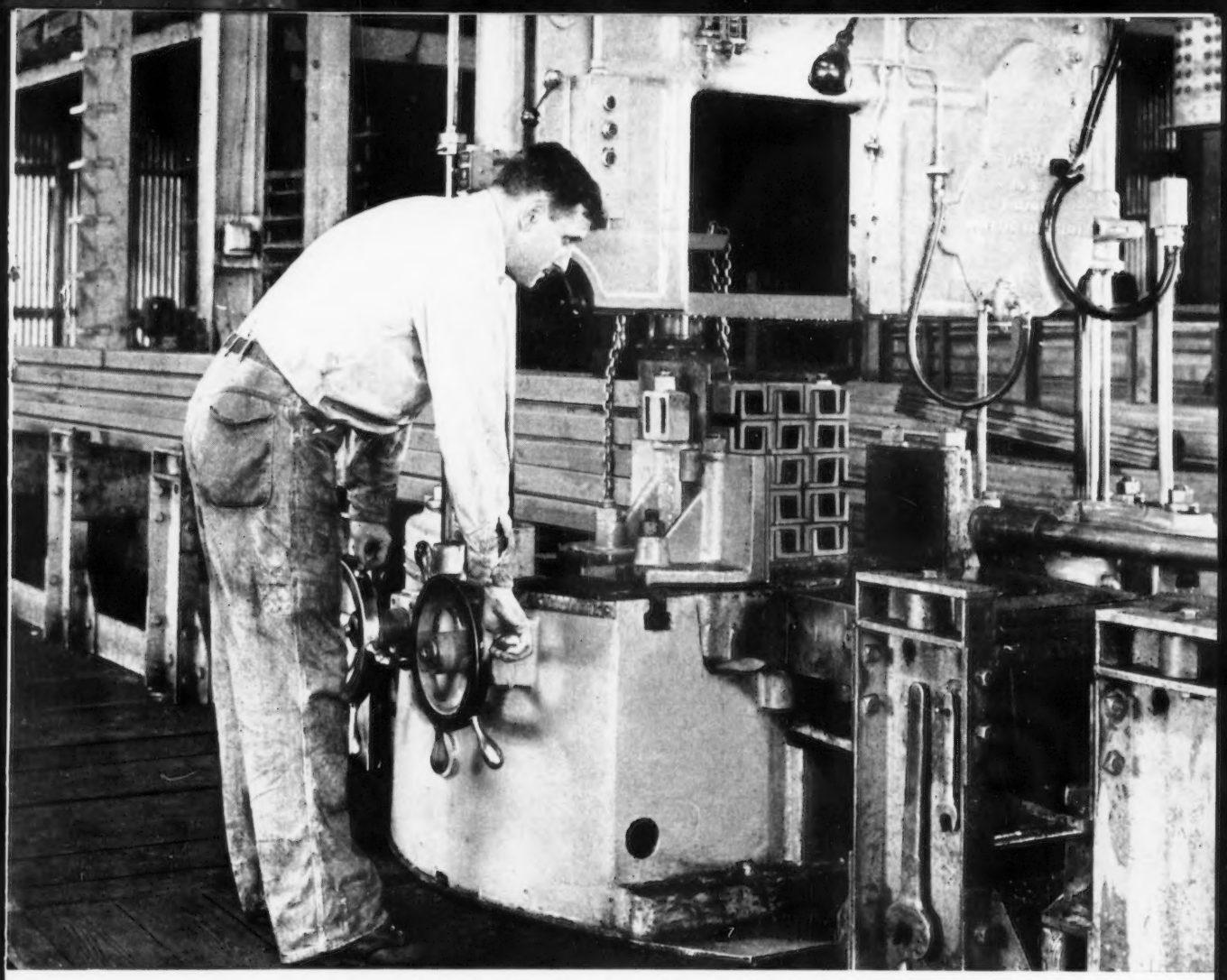

Special services, such as cutting channels to length, are offered by distributors of Bethlehem products.

Distributor Makes the Tough Plays Look Easy

That's probably the way a sports writer would say it. And Henry H. Lawyer, purchasing agent for Diamond Expansion Bolt Company, agrees.

"Our favorite steel-products distributor," he says, "is one of the top names on our where-to-buy list. We manufacture expansion bolts, cable reels, tools, forms for prestressed concrete, and numerous other items. We need quite a variety of steel. If it weren't for the distributor, we'd often be handcuffed. He's reliable, and his stocks are always first-class.

"Sometimes we give him a really tough play to handle. Like the time we wanted 30,000 lb of ship channels to reinforce steel reels. We were building the reels for a good customer who needed unusually quick delivery. The channels were a problem—or so we thought. But our distributor friend had the necessary stocks, and a saw that could cut them to specified lengths. He had to work fast. But even though the heat was on, he seemed to take the whole thing in stride. He made delivery on time; we finished the reels on time, and there wasn't a hitch anywhere."

HERE'S WHAT THE DISTRIBUTOR OFFERS YOU. Bethlehem sheets, bars, shapes, plates, tool steel, and other steel products are stocked by distributors in all parts of the country. Acting as your "storage space," the distributor shoulders the "cost of possession"—items such as insurance, machinery for processing steel, tax on inventories, etc. Because of his specialized equipment, he can perform such services as cutting, sawing, slitting, and even testing. And of course, he's always geared for fast delivery.

H. H. Lawyer, Purchasing Agent, Diamond Expansion Bolt Company, Garwood, N. J.

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The IRON AGE

December 5, 1957—Vol. 180, No. 23

Digest of the Week in

*Starred items are digested at right.

NEWS ARTICLES

PRODUCT DEVELOPMENT

Case History — Four years ago, Black & Decker had the first idea

of developing a magnetic drill press. Now, it's on the market and doing well. This case history traces the story of its development. P. 91

IKE'S ILLNESS

Its Effect on Business — The President's attack comes at a bad time. Business was already undergoing severe stresses and strains. But in the long run, Ike's condition will have little impact on the economic outlook. P. 94

MISSILES PROBE

Triggers Defense Spending—Senate missile investigation will spur a multi-billion-dollar program in advanced weapons development. Congress may end by giving the military a virtual blank-check budget to get things moving. P. 97

LABOR UNREST

In Detroit—The Big Three automakers have been hit by a rash of

Metalworking

SPACE METALLURGY: Urgency of the missile program puts the metallurgical spotlight on meteorites —like the one being examined by U. S. National Museum's E. P. Henderson. Do these specimens from outer space hold the secret to the re-entry puzzle? P. 131

strikes and strike threats. Most of the trouble centers on new production standards. Unions may be softening up management. P. 108

STANDBY CONTROLS

In the Works — Standby price controls are once again advocated. Belief is they would be necessary in case of emergency. Some businessmen are quietly, but actively, behind the program. P. 113

FEATURE ARTICLES

FOUNDRY CYCLE

Flask Handling Made Easy—Without the need of once handling the flask, an automatic molding setup performs molding, closing, and shaking out. The cycle with a master unit controlling each step produces an average of 2400 engine-block castings per day. P. 134

JOIN ALUMINUM, IRON

How to Get Stronger Bonds—Recent studies of hot pressure bonding show that strength is greatly effected by variations of temperature, pressure and time. It's the part played by pressure that may call for some drastic revisions in basic data. P. 136

JOB SHOP PRODUCTION

Diversity No Problem — Small lots, die changes, inventories, plus a score of other problems, stand in the way of a job shop's efficiency. Ford's Hardware Div. plant takes care of these problems by mixing job-shop techniques with those of a mass-production plant. P. 140

TITANIUM SPHERES

Form by Hot Spinning—An improved process for hot spinning thick titanium alloy hemispheres is aimed at making lighter-weight pressure vessels for missiles. Hydraulic control of spinning machine insures accurate dimensions. P. 142

AUTOMATED LINE

Adapts to Design Changes—Forethought at the time an automatic line is planned can provide for inexpensive changes. Standardized dimensions for such things as table heights and widths, assembly holes, and work holding devices pay dividends in flexibility. P. 144

MARKETS & PRICES

ALUMINUM SHEETS

No Longer a Specialty—New Alcoa mill rolls wide aluminum sheets as a production product. Aircraft frame makers are among those benefitting from wide product with narrower tolerances. P. 96

FARM EQUIPMENT

The Road Back — After four years of sinking sales, farm machinery makers report business is up in 1957. They believe 1958 will bring more gains. Many think they have turned the corner. P. 98

AIR CONDITIONERS

Industrial Sales — It's currently the biggest market, but air conditioner makers figure factories still constitute a vast, untapped potential. They'll aim their sales guns in this direction in 1958. P. 100

MACHINE TOOL SALES

Lowest in 7 Years—Net new orders for October added up to only $27.9 million. It was the poorest new-order month since February, 1950. Many plants have cut their work weeks to 35 hours. P. 117

STEEL USAGE

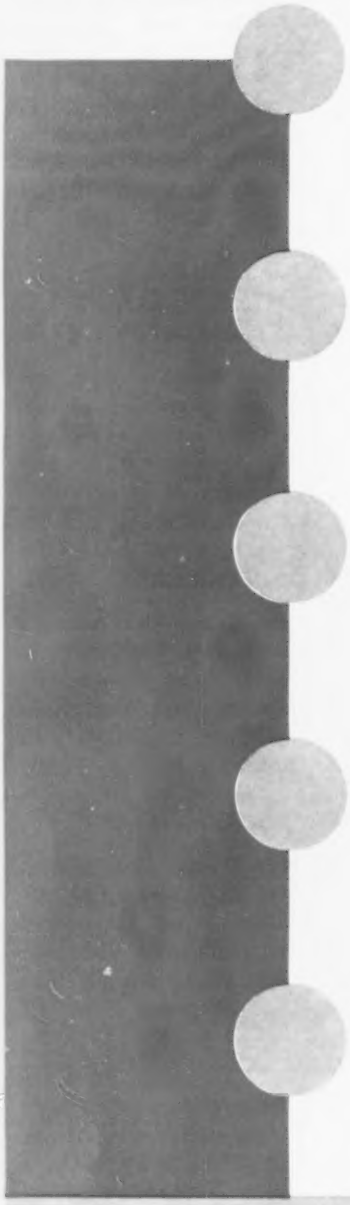
What Doesn't Show—Lost sight of in current steel market is the record rate of steel use. This year some 84 million tons will be chewed up by steel's customers—a record. P. 171

NEXT WEEK

COST CUTTING

Not So Easy—In any cost-cutting program management must know where to start. Some areas will pay off immediately. Others won't. Next week's feature article will contain a rundown of items most likely to yield higher savings in less time.

60 CYCLE INDUCTION MELTING



A famous metallurgist once wrote: "50% of all rejects can be traced to faulty melting and pouring." When molten metal is overheated, important alloy ingredients are lost by burning. Castings or billets may be porous from combustion gases absorbed by the molten metal. Frequently, unwanted alloy ingredients are picked up from the containers used in melting. If the temperature of molten metal flowing into a mold strays from the optimum, defective castings will result. In a quiet melt alloy ingredients may not dissolve properly, and the metal cast will not meet specifications. Finally, there is the problem of nonmetallics suspended in the melt which cause occlusions and other difficulties in the end product.

60 CYCLE INDUCTION MELTING, properly applied, is probably the biggest single step that can be taken to overcome these traditional melting problems. The method is unique in its combination of two factors: Heat is generated only in the molten metal, and the entire melt is stirred by electromagnetic pressure. Furthermore, high melting rates can be concentrated in a small space. —No part of the furnace is hotter than the metal. Combustion gases are absent and controlled atmospheres can be used. The container is constructed of refractories inert to the molten metal. Temperature control of unprecedented precision is inherent in the method. Electromagnetic stirring assures complete dissolving of all ingredients and a uniform alloy. Suspended nonmetallics are deposited in the electromagnetic pressure area.

These are basic reasons why 60 CYCLE INDUCTION MELTING has had such a spectacular growth in the postwar period. Modern plants require high production rates with controlled quality, yet can assign only a minimum of skilled labor to each operation. 60 CYCLE INDUCTION MELTING minimizes hard labor in melting. It enables process control to substantially decrease the effect of human error. Cost reductions are reflected throughout each step of fabrication of a casting or billet to its end use.

60 CYCLE INDUCTION MELTING, firmly established for thirty years as the predominant production method for melting brass, has recently been applied on a much larger scale. In the last ten years, as new furnace designs became available, the method has been rapidly adopted by many progressive companies in the fields of aluminum die casting, aluminum extrusion, aluminum wire, aluminum coating, leaded copper alloy casting, zinc die casting, and galvanizing of strip in the steel mills. Well over one thousand 60 CYCLE INDUCTION MELTING furnaces are now operating in these new fields.

Our 60 CYCLE INDUCTION MELTING furnace takes many different forms to meet the needs of all these industries. Unit production rates now range from 150 pounds to 40 tons per hour. We specialize in the development, design, and manufacture of standard and custom-built furnaces to meet each requirement. If there is a production melting problem in your operation which may benefit from a basic change in method, we should be glad to discuss the possibilities with you

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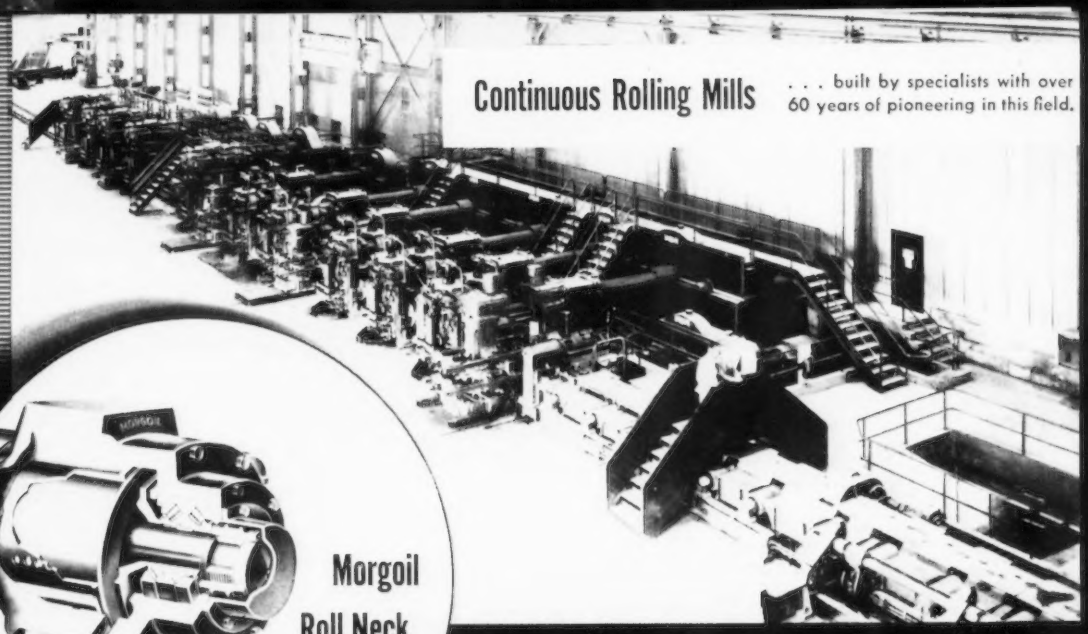

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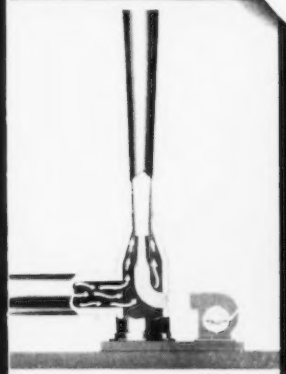
Can help you produce more and better steel products

G-2



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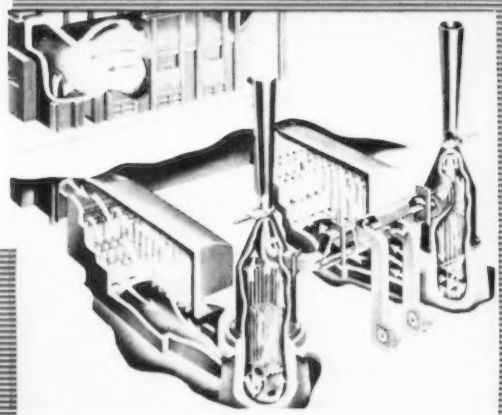
. . . efficiently handle hot gases and fumes as high as 3000° F.

Wire Machines . . . Morgan-Connors give high production, with low die cost, low power cost, low space requirement.



Furnace Control System

. . . Morgan-Isley increases efficiency of any regenerative furnace at relatively low installed cost. G-2

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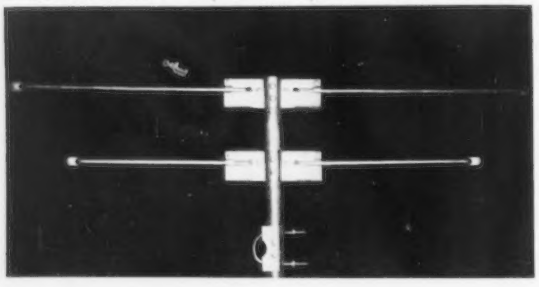
Give Outdoor Products Long Life at Low Cost with Armco ALUMINIZED STEEL Type 2

High temperature vessels, like this one at a Texas refinery, are protected **and insulated** by ALUMINIZED STEEL Type 2. Units are shielded from weather by casings made of ALUMINIZED STEEL. In addition, this aluminum-coated special steel provides insulation by reflecting heat.

At Rockaways' Playland, New York, rolling doors of ALUMINIZED STEEL eliminate yearly painting, give better service than any doors used before. In fact, plans call for eventual replacement of all rolling doors with durable doors of Armco ALUMINIZED STEEL Type 2.

TV antennas take the full brunt of wind and weather. High strength and rust-resistance are essential. That's the reason the manufacturer of this mast fabricates clamps and other parts from ALUMINIZED STEEL.



Special hot-dip aluminum coating seals out atmospheric corrosion—assures durability—keeps maintenance low

More and more outdoor products now provide much longer service life at low cost because of the unique combination of advantages offered by Armco ALUMINIZED STEEL® Type 2.

Atmospheric corrosion resistance is its major benefit. 15-year tests of unpainted samples in a mild industrial atmosphere show life of the aluminum coating on ALUMINIZED STEEL Type 2 is *at least 3 times* that of a commercial zinc coating on galvanized steel sheets.

What's more, this sturdy steel reflects heat like aluminum. Its attractive, bright finish *needs no paint*. It offers real economy when compared strength-for-strength or thickness-for-thickness with aluminum.

GET COMPLETE DATA

It may pay you to investigate the advantages of this new aluminum-coated steel for *your* outdoor products. Just fill in and mail the coupon or call the nearest Armco Sales Office.

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Mr. Eisenhower's Quandary Only He Can Steer His Course

Fully cognizant of medical and layman viewpoints on heart attacks, Mr. Eisenhower chose to run for a second term. The majority of us wanted him to run—and win. That played some part in his decision.

Now the President has another difficult personal problem. It is too early yet for him to make a choice. He will though, regardless of what advisors, press relations people, or armchair diagnosticians say.

We have Ike's own words on that. If he thinks he can't carry on his job as he believes it should be done, he will resign. That's what he said. Of course he knows what happened to him and what its significance is.

His rapid and excellent recovery is but further evidence of the power of mind over body. It is proof too that Mr. Eisenhower is dedicated to his job. Doctors and advisors seldom can do much with dedicated people when it comes to slowing them down.

The strain of world affairs, defense problems, budget difficulties, Congressional meetings and the Red threat would be tough for an ordinary man. But Ike isn't an ordinary man. He does know what a load he will carry when he again takes complete charge.

When has a man done his utmost for his country? When has he discharged his complete duty? Must he damage himself in the attempt or in the fulfillment? That is for him to decide.

We have evidence that Mr. Eisenhower knows exactly what it means to be restricted in his actions. He has become frustrated at times: on occasions he, like millions of others, has failed to do as his doctors have ordered.

Ike now has a stock of health experience to draw upon when he begins to set his future course. He knows even more than do the doctors. Certainly ideas on his own safety will be far from his first thoughts.

We must recall that he has trained well his excellent assistant, Vice-president Richard Nixon. He has done a good job training others who have helped him run his back-breaking and tension-loaded job. The country is not going to fall apart because Mr. Eisenhower has suffered a mild cerebral attack; neither is he.

Mr. Eisenhower will work his own way out of his quandary—and it will be the right way.

He knows what he's doing!

Tom Campbell

Editor-in-Chief

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Clark Equipment Company 180 Turbo-Dozer

Forged ball-joint housing saves 90¢ plus 10% on machining

Clark Equipment Company switched to upset forgings for its ball-joint housings with impressive results. The part used for the steering and driving mechanism of its line of Four-Wheel Drive MICHIGAN End Loaders and Turbo-Dozers was formerly produced as a steel casting.

After the housings were turned out by Commercial as closed-die forgings on an 8-inch upsetter, Clark Equipment reported:

1. A 15 lb. saving of metal through a weight reduction from 95 to 80 lbs.
2. An initial cost saving of 90¢ per part.
3. Closer tolerances—some dimensions even to finished size—for a 10% machining cost saving.
4. No rejects due to hidden metal faults.

Now, this important component not only costs Clark less but also provides the strength, inherent in all forgings, to resist unusual operating strains and assure longer, trouble-free performance.

Many parts like this unusually shaped housing, which were formerly considered impossible to forge, are now routine at Commercial. An early check with Commercial's forging engineers on your particular component forming problem will prove it to you—may save you time, money, help improve performance.

WHEN AN UPSET FORGING?

Check your part forming problems against this list of "bench marks" for parts requiring:

- **Reduced weight, thinner section, greater strength.**
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- **Good appearance—smooth, close-grained surface.**
- **Superlative shock and fatigue resistance.**
- **Uniform response to heat treatment.**
- **Cost-cutting advantages in finishing—less waste metal, reduced machining, no rejects due to hidden flaws.**

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LETTERS FROM READERS

Business As Usual

Sir — Your editorial in The IRON AGE, Oct. 31, 1957, "Business as Usual? Hardly, for Quite Some Time," certainly set right with me. More of the same type of writing is what this country needs.

The complacent feeling which we in this country have had must certainly be replaced by one of grave concern. We cannot long survive, in this age of rapid advancement, with the attitude that the scientific progression we now have shall serve as a panacea for the future.—R. E. Young, Mfg. Engineering, Specialty Transformer Dept., General Electric Co., Fort Wayne, Ind.

Good Choice

Sir—Enclosed is my check for the Temperability Calculator (New Temperability Calculator: Accurate Estimating Replaces Guesswork," Oct. 24, p. 227.) Never have I seen so much metallurgical knowledge so concisely presented.

I believe your publication is tops and if my reading had to be restricted to one periodical IRON AGE would be it.—J. H. Frome, Jr., W. B. Coleman & Co., Philadelphia.

Feels Let Down

Sir—As an admiring reader of The IRON AGE as a top metallurgical trade journal, I was extremely disappointed to learn that the magazine is so misinformed on the subject of economics. Both Mr. Janeway in the Nov. 14 issue and the Editor in the Nov. 21 issue conclude that defense spending and the push-button Federal Reserve interest rate means assured prosperity.

I should like to call your attention to the Department of Defense expenditure chart on p. 119 of the Nov. 14 issue. During the years shown prosperity, as measured by corporate profits after taxes, was the highest during those years when defense spending was lowest and vice-versa. Back to metals, gentlemen—you were doing a good job! —G. Thorpe, Buffalo, N. Y.

▪ We don't claim that defense spending in itself brings prosperity. But its very size tends to cushion any recession—Ed.

Explorer Seeks Help

Sir—I am conducting exploration towards the discovery of man's earliest bit of iron fabrication, extant. In this connection it appears reasonable to search into the remote past of pre-historic Asia (near & Far East).

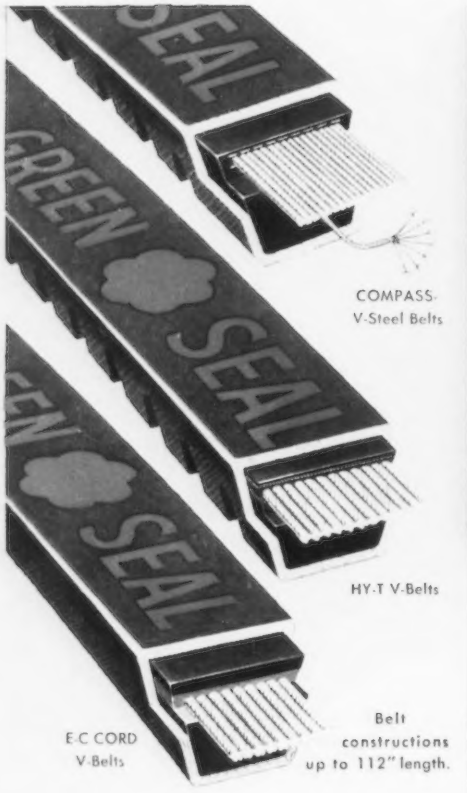
Perhaps some of your readers have information concerning this project. If so, any clue will be appreciated since there is a fascinating public service in the making. —A. Perpall, Tradewinds, P. O. Box 732, Grand Central Annex, New York, N. Y.

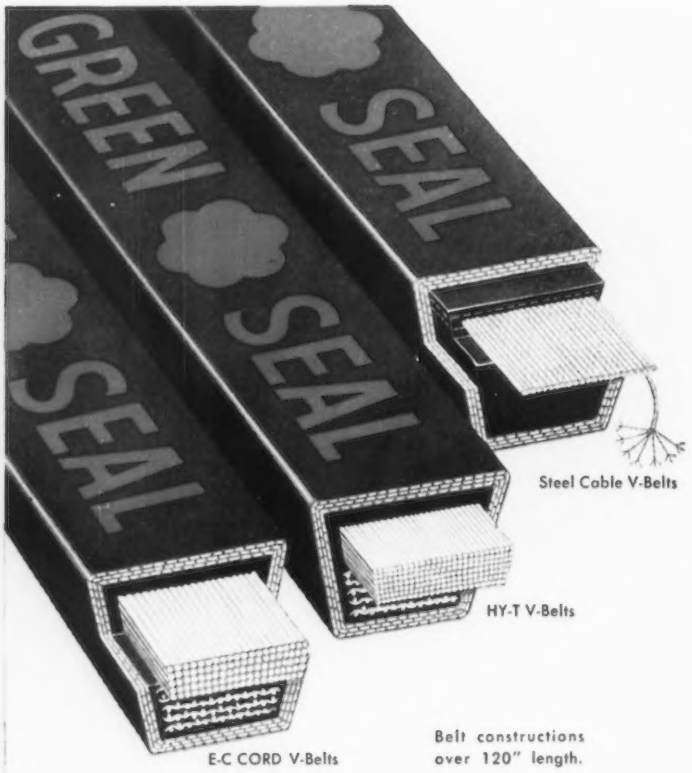
▪ Can any reader help?—Ed.

"I think it's about time we eliminate some of the dead wood around here."

Do you know the inside story of

V-Belts with the Green Seal?





Until recently dimensional stability was possible only in V-Belts with steel load-carriers as developed by Goodyear. But now you can have that stability in a complete line of belts – thanks to the development of Triple-Tempered (3-T) cord–synthetic cord tempered by Tension, Temperature and Time.

What's your pay-off from this dimensional stability?

When you're belting multiple drives, it's your one guarantee that every set of matched belts will *really* match. No matter how long you store them, they'll *stay* matched, too.

And once they're installed, you've got belts designed and built to work as a perfect team–without individual belts either "loafing" or overworking. In fact, you're protected from all the usual mismatching headaches that also include slipping, stretching, scorching.

In other words, you're belted for maximum trouble-free horsepower hours at minimum cost. There's no substitute for that kind of performance – or for the V-Belts with the Green Seal that give it to you – every time.

So see your dealer about the V-Belts with true dimensional stability–the V-Belts with the Green Seal. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

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with the GREEN SEAL by

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Space Problem

Falling meteorites are nothing new. We've all seen their red traces streaking across night skies. Fortunately, most of them never reach the earth. But the few that have are being studied anew.

For meteorites are the only known objects to survive the trip from outer space to earth. Their ability to solve the "reentry problem" has aroused the interest of missile scientists and engineers.

Clue To New Alloys?—Missiles should contain metals able to resist the terrific frictional heat built up on reentering the earth's atmosphere. This may call for the development of new metals and alloys. Some answers to these materials needs may well be found in the metallurgy of meteorites.

One of the finest collections of meteorites is housed in the U. S. National Museum (Smithsonian) in the nation's capital. And one of the best-informed meteor experts is Edward P. Henderson, Associate Curator of the museum.

To fill you in on the metallurgy of meteorites, and what it may hold for missile scientists, Metallurgical Editor Paul Unterweiser trekked to Washington and interviewed Dr. Henderson. His report on this fascinating subject begins on p. 131.

New Puzzlers

Mr. Blaisdell was shipwrecked and washed ashore on an isolated and sparsely settled island. Coming upon a rude shack he told the native who answered the door that he must have lodging but had no money. He did have, however, a gold chain that had one hundred and fifty-nine links which he offered to pay at the rate of one link a day for his bed and board. The native agreed.

The chain being an heirloom and highly prized, Mr. Blaisdell wished to keep it intact as much as possible, especially in view of the fact that he wished to retrieve it after he had communicated with his family and funds had been sent to him.

What was the minimum number of breaks that he must have made to make the payments at the rate of one link a day for a hundred and fifty-nine days.

METEORITE EXPERT: Dr. E. P. Henderson holds meteorite up for examination by metallurgical editor, Paul Unterweiser on recent visit.

EXHIBITS, MEETINGS

Plant Management and Engineering Show—Jan. 27-30, 1958, International Amphitheatre, Chicago.

Packaging Machinery and Materials Show—March 25-28, Convention Hall, Atlantic City, N. J. (Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22.)

DECEMBER

American Institute of Chemical Engineers—Annual meeting, Dec. 8-11, Conrad Hilton Hotel, Chicago. Society headquarters, 25 W. 45th St., New York.

IRE, ACM, AIEE—1957 Eastern joint computer conference and exhibit, Dec. 9-13, Sheraton-Park Hotel, Washington, D. C. Information: IBM Corp., 1220 Nineteenth St., N. W., Washington, D. C.

The Material Handling Institute—Annual meeting, Dec. 10-11, Roosevelt Hotel, New York. Society headquarters, One Gateway Center, Pittsburgh.

Society of the Plastics Industry, Inc.—Conference on vinyl products in the consumer field, Dec. 10-11, Hotel Commodore, New York. Society headquarters, 250 Park Ave., New York 17.

JANUARY

Southern Industrial Distributors' Assn.—Midyear meeting, Jan. 6-8, Roosevelt Hotel, New Orleans. Society headquarters, 1626 Fulton National Bank Bldg., Atlanta 3, Ga.

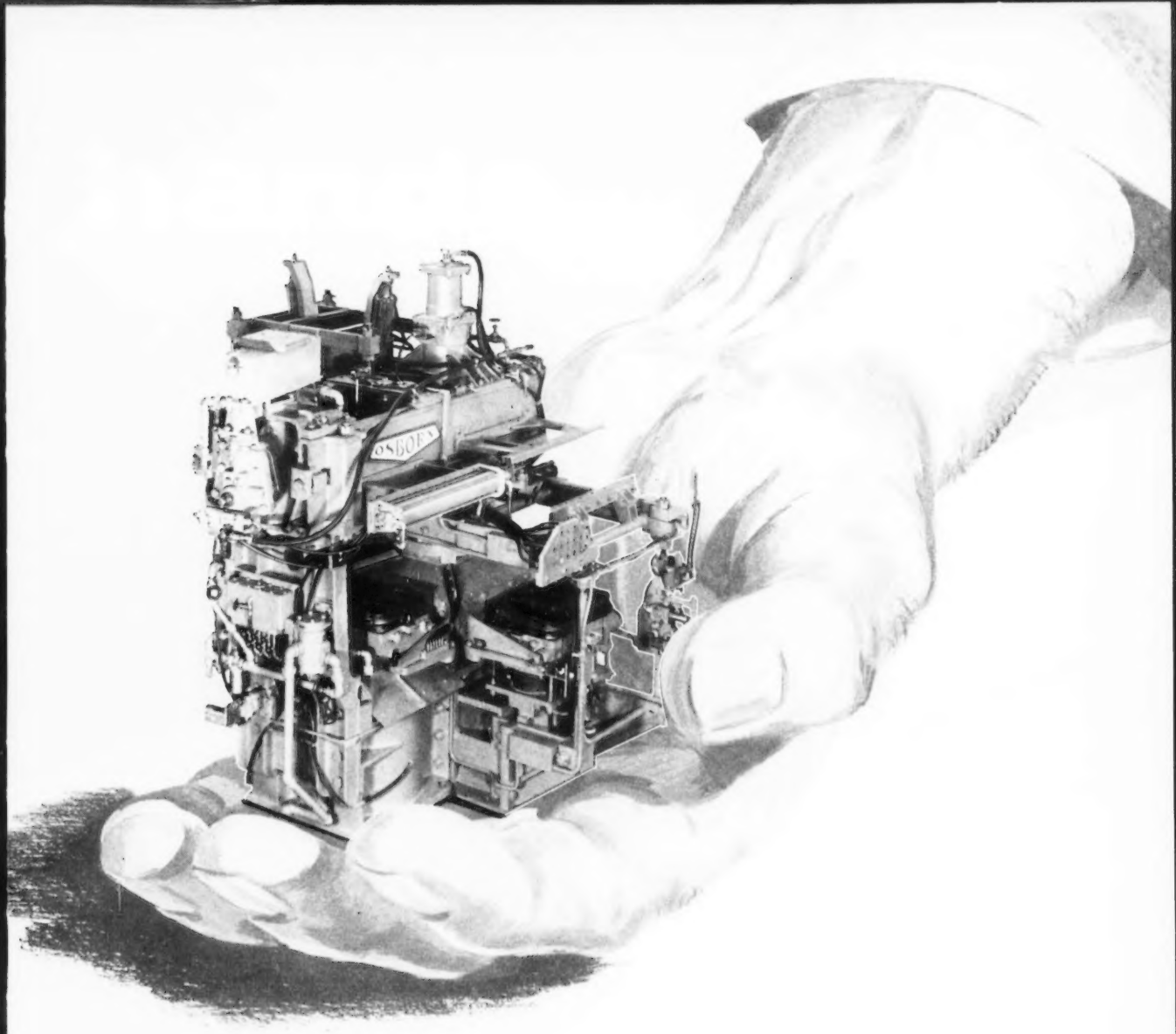
Society of Automotive Engineers, Inc.—Annual meeting, Jan. 13-17, Hotels Sheraton-Cadillac and Statler, Detroit. Society headquarters, 485 Lexington Ave., New York 17.

Malleable Founders' Society—Semiannual meeting, Jan. 17, Hotel Cleveland, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

Institute of Scrap Iron & Steel Inc.

(Continued on P. 16)


MEMBER
FEMA



when you call for an Osborn Methods Study

There's a sure way to lower foundry costs . . . to speed production . . . to increase efficiency. OSBORN *knows that way.* That's why you're in good hands when you call on OSBORN first—when your production plans are still in the "talking stage".

Cost-minded foundrymen *count on* OSBORN for the most advanced methods and equipment. They count on the *bonus-value* of OSBORN'S 50 years' technical and application experience . . . experience that has enabled OSBORN to develop its complete line of dependable, efficient foundry production machinery.

OSBORN'S staff of experienced foundry specialists stand ready to assist in developing the best setup for your foundry. Without obligation, they will conduct an **O**sborn **M**ethods **S**tudy . . . a complete study of your molding and core making methods . . . to show exactly where you can improve your operations. Write for full details. *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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CORE BLOWERS
SHELL MOLDING MACHINES
BRUSHING MACHINES
INDUSTRIAL BRUSHES

EXHIBITS, MEETINGS

(Continued from P. 13)

—Annual meeting, Jan. 19-22, Eden Roc, Fontainbleau, and Deauville hotels, Miami Beach, Fla. Society headquarters, 1729 "H" St., N. W., Washington 6, D. C.

Truck Trailer Manufacturers Assn.—Annual meeting, Jan. 20-22, Palm Beach Biltmore Hotel, Palm Beach, Fla. Society headquarters, 710 Albee Bldg., Washington 5, D. C.

American Road Builders' Assn.—Annual meeting, Jan. 20-23, Sheraton-Park Hotel, Washington. Society headquarters, 600 World Center Bldg., Washington 6, D. C.

American Institute of Electrical Engineers — Winter meeting, Jan. 20-24, Hotel Statler, New York. Society headquarters, 33 West 39th St., New York 18.

Steel Shipping Containers Institute, Inc.—Winter meeting, Jan. 21-22, St. Regis Hotel, New York. Society headquarters, 600 Fifth Ave., New York 20.

Industrial Heating Equipment Assn. — Annual meeting, Jan. 27-28, Penn-Sheraton Hotel, Pittsburgh. Society headquarters, 1145 19th St., N. W., Washington 6, D. C.

FEBRUARY

Malleable Founders Society—Technical and operating conference, Feb. 6-7, Wade Park Manor, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

American Society for Quality Control—Annual conference on management by exception, Feb. 7-8, Carter Hotel, Cleveland. Information: B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland.

American Institute of Mining, Metallurgical & Petroleum Engineers—Annual meeting, Feb. 16-20, Hotels Statler and Sheraton-McAlpin, New York. Society headquarters, 29 W. 39th St., New York.

no chipping - no rusting
no pitting - no peeling

no work-no worry

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Superior stainless steel

Let it rain, mist or dew . . . for the lifetime of the car, stainless steel brightwork never needs care. Exposure to the elements can't harm it. You don't lift a finger or pay a penny to keep the showroom shine of *stainless*. • Strong, hard, ever-bright stainless steel will serve you best on your new car, and protect top value when you sell. *And the chances are, it'll be* SUPERIOR.

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12½-minute baking cycle overhead speeds production below

Far-sighted planning by The Wright Line, Inc., prevented costly production line bottlenecks in their new one-story plant in Worcester, Mass. By suspending compact Fostoria Radiant Ovens ceiling-high . . . drying the "fine-wrinkle" finish on their metal card-handling cabinets is accomplished in 12½ minutes through controlled 365° F. radiant heat – and without interrupting the continuous flow of products at floor level!

Painted units are conveyed from spray booths upwards through 5' x 6' tunnel openings in their two 28½-foot Fostoria infrared ovens, for a fast, uniform baking-out operation. Valuable floor space is saved, production moves smoothly, and a better finish is assured at lower cost through efficient Fostoria radiant heat.

Consulting your Fostoria sales engineer can bring out some important cost-saving solutions to your finishing problems . . . heating, degreasing, baking, drying. He'll give you the facts on Fostoria radiant equipment – infrared lamp, quartz lamp or radiant rod – that will do the most work for you at lowest cost.

Write for free 20-page book, "Radiant Heat – applications unlimited"

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FOSTORIA PRESSED STEEL CORPORATION • Dept. 1224, Fostoria, Ohio

Pioneer manufacturer of radiant equipment—components and complete ovens

GET TRIPLE-ACTION IMMUNOL

(Reg. U.S. Pat. Off.)

The SAFE, LOW COST METAL CLEANER and RUST PREVENTIVE that will do more jobs for you!

Non-flammable, non-toxic, odorless IMMUNOL cleans, degreases and rustproofs metal in one, fast, easy operation. It is widely used as a bucket solvent in metalworking plants to remove cutting oils, drawing compounds, mill dirt, stains, etc. from metal and it can be used over and over again.

IMMUNOL is widely used for these other applications, too:

AS AN ADDITIVE TO SOLUBLE OIL EMULSIONS
IMMUNOL gives cooler work, better tool life, better finishes and additional rust protection

AS A TEMPORARY "IN PLANT" RUST PREVENTIVE
IMMUNOL immunizes against rust for a few days prior to subsequent operations

TO REPLACE SOLVENT AND VAPOR DEGREASING
IMMUNOL will be just as efficient as other solvents. It will prevent rust and operators will like it better since bad odors, skin irritations and the danger of fire will be eliminated

FOR TUMBLING METAL
IMMUNOL is used (1) before tumbling as a cold dip to remove oils (2) as a rust inhibitor in the barrel to stop rust when parts susceptible to rust are being cleaned (3) to replace soap as a cleaner (4) as a dip rinse and rust preventive immediately after tumbling

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IMMUNOL gives better definition of flaw than kerosene or mineral spirits, eliminates the fire hazard, is odorless and prevents rust

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Flag-raising day at another great new Olin Aluminum plant

Cradled in the heart of the Ohio River Valley, this expansive industrial giant is about to spring to life.

Ultra-modern from the ground up, this huge new Olin Aluminum Sheet Mill within a few short months will add its production to the vigorous mainstream of quality Aluminum flowing to the nation from four Olin Aluminum plants.

Flag-raising day at this giant new mill will mark an important new chapter in the exciting 22-month growth of Olin Aluminum. New ore ships, rolling mills, extrusion plants and wire and cable mills are already in operation or under construction. With these modern, fully-integrated facilities, Olin Aluminum is right now on the way to an initial annual volume of 340 million pounds of quality Aluminum. And that is only the beginning.

This new Aluminum will be custom-tailored to your specifications. And the unique standards of quality and service by which it will be produced and delivered to you will help you simplify your manufacturing procedures and achieve maximum efficient production from each pound you use.

If this is the kind of quality and service you have long been looking for, write now for product availabilities to our new permanent sales headquarters: Aluminum Division – Sales, Olin Mathieson Chemical Corporation, 400 Park Avenue, New York 22, New York.

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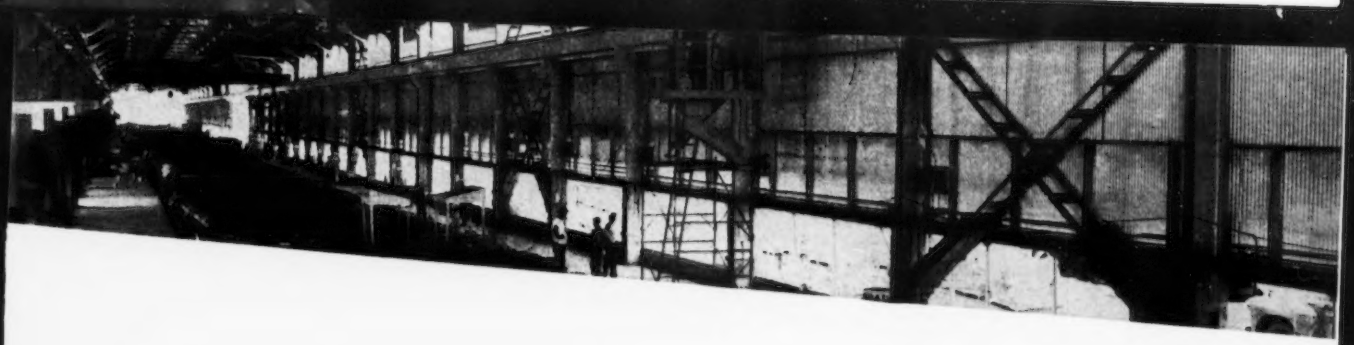
Symbol of new Standards of Quality and Service in the Aluminum Industry



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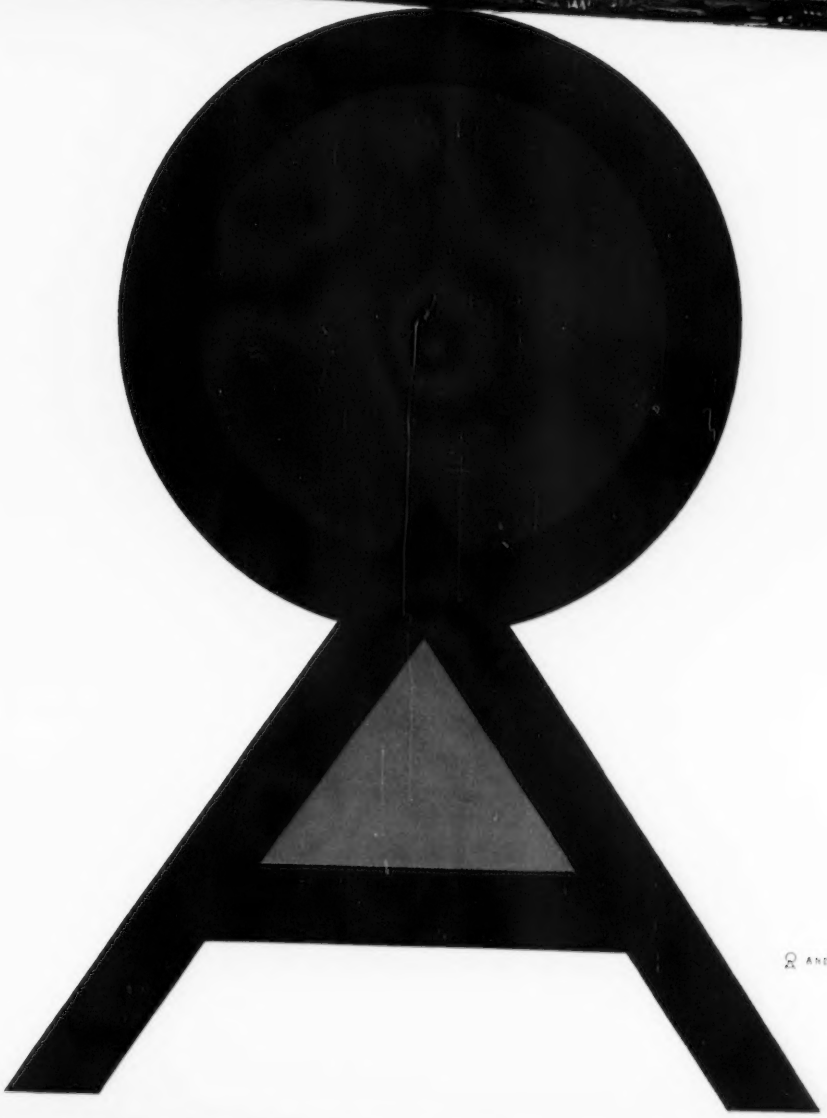


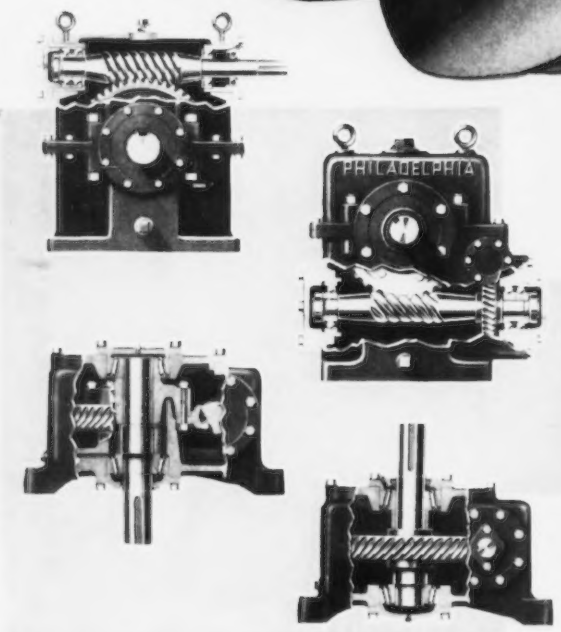
AND ALCOA ALUMINUM ARE TRADEMARKS

Here's where Worm Reducer Efficiency Begins

Because the service life and efficient operation of any Worm Gear Reducer depends upon the precise meshing of the worm and gear, we make every possible effort to assure that they are properly centered when the unit is assembled, and that the alignment will be permanent . . . Worms are of finest quality alloy steel with case hardened threads—shaft and threads being smoothly ground and polished after hardening. Worm gears for smaller size units are of solid chill cast nickel-bronze to meet AGMA specifications; while for larger size units the gear is made in two parts—the rim of chill cast nickel-bronze, bolted with fitted bolts and locknuts onto a semi-steel center.

The engineering skill and knowledge put into these features alone are indicative of their entire construction.

Scientific design, unexcelled workmanship, finest materials, rugged construction, noiseless and vibrationless operation, long-life and highest efficiency—are the "end results" that have earned an enviable reputation for Philadelphia Worm Reducers.



PHILADELPHIA WORM GEAR REDUCERS

A complete range of unit types and sizes to cover applications from 1/4 to 265 H.P. Ratios from 3 5/8 to 1, to 6300 to 1. Our latest Catalog, WG-156, gives complete details . . . When requesting Catalog, please use your business letterhead.

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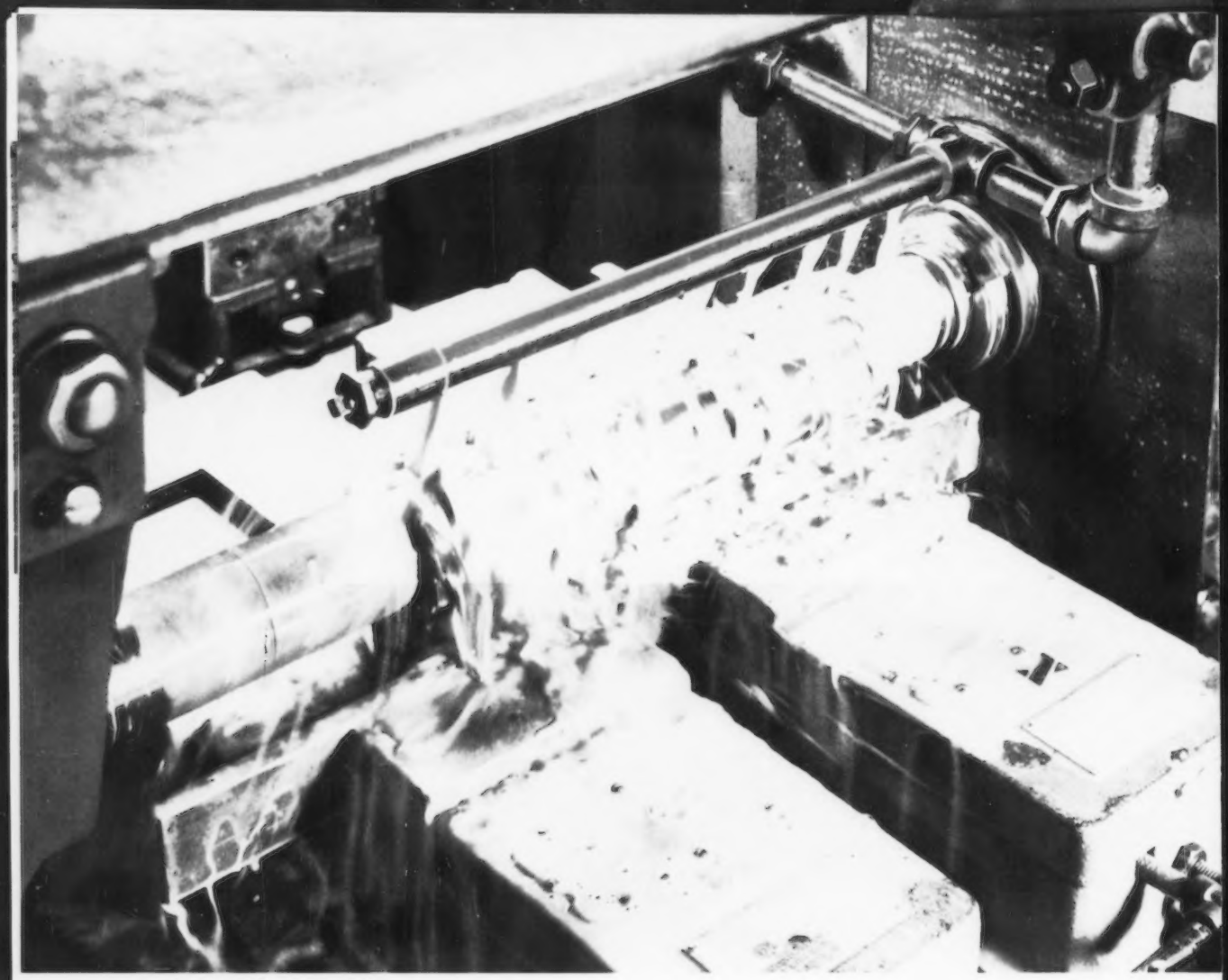
NEW GULFCUT

GULF

HEAVY DUTY SOLUBLE OIL *For heavier cuts at higher speeds with longer tool life even in turning chrome-nickel steels and other tough alloys!*



NEW GULFCUT HEAVY DUTY SOLUBLE OIL

increases the efficiency of a wide range of machining and grinding operations . . . because:

1. Its lubricating-cooling-protective properties meet the heavy duty machining needs of today.

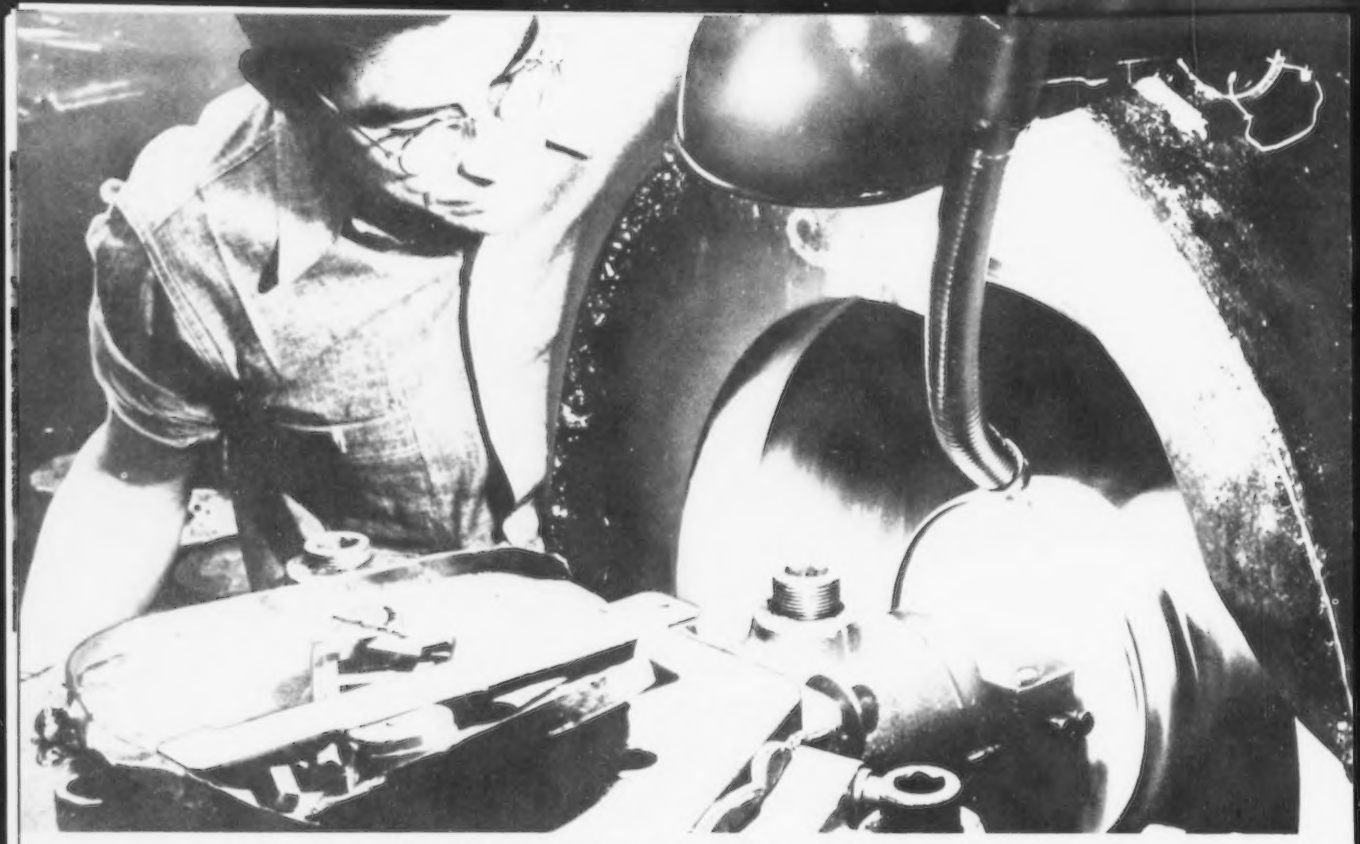
2. It permits higher speeds, deeper cuts . . . gives finer finishes, longer tool life . . . offers greater protection against corrosion . . . helps eliminate rancidity!

3. It performs efficiently even when mixed 1 to 150 parts of water . . . and has exceptionally long service life!

This new Gulf product is a heavy duty soluble cutting oil with a petro-chemical emulsifier. Its applications include heavy hogging cuts, fast fine cuts, boring, and grinding of ferrous materials, tough alloys—such as titanium and chrome-nickel-moly steels—and soft, non-ferrous metals, such as aluminum.

Shop-proved Gulfcut Heavy Duty Soluble Oil won't separate or gum in wheels, slides or ways. It contains a potent rust inhibitor which provides greater protection against rust and corrosion. It has excellent emulsion stability even in hardest water. It has high surface-wetting properties for more effective cooling. It is anti-weld, anti-wear and anti-foam. Also contains an effective germicide to help eliminate rancidity and odor.

Gulfcut Heavy Duty Soluble Oil has been used extensively at W-K-M Division of A-C-F Industries, Inc., Houston, Texas. After months of diversified turret lathe operations: threading, boring, facing, turning, grooving—this Gulf customer says: "Gulfcut Heavy Duty Soluble Oil gives us long tool life, and excellent finishes."



Gulfcut Heavy Duty Soluble Oil has high surface-wetting qualities, for more effective cooling. For effective protection against rusting, three anti-corrosion agents are combined in the new oil.

Independent machine shop tests prove the superiority of GULFCUT HEAVY DUTY SOLUBLE OIL

Here are some of the first reports from the field on the performance of Gulfcut Heavy Duty Soluble Cutting Oil:

- "Grinds twice as many pieces before wheel dressing!"
- "Makes possible increase in depth of cut from $\frac{1}{4}$" to $\frac{1}{2}$" per pass!"
- "Tolerances of 6 microns, instead of 16!"
- "Has made possible increased boring speeds!"

Get the full efficiency-economy story on new Gulfcut Heavy Duty Soluble Oil now! Call your Gulf Sales Engineer, at your nearest Gulf office, or mail the coupon.

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THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

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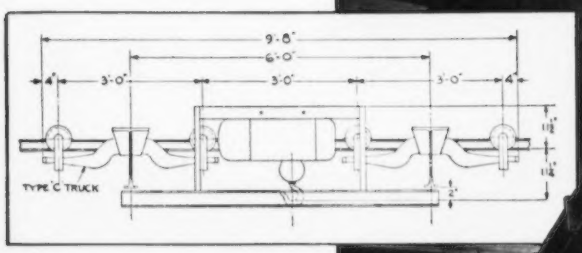

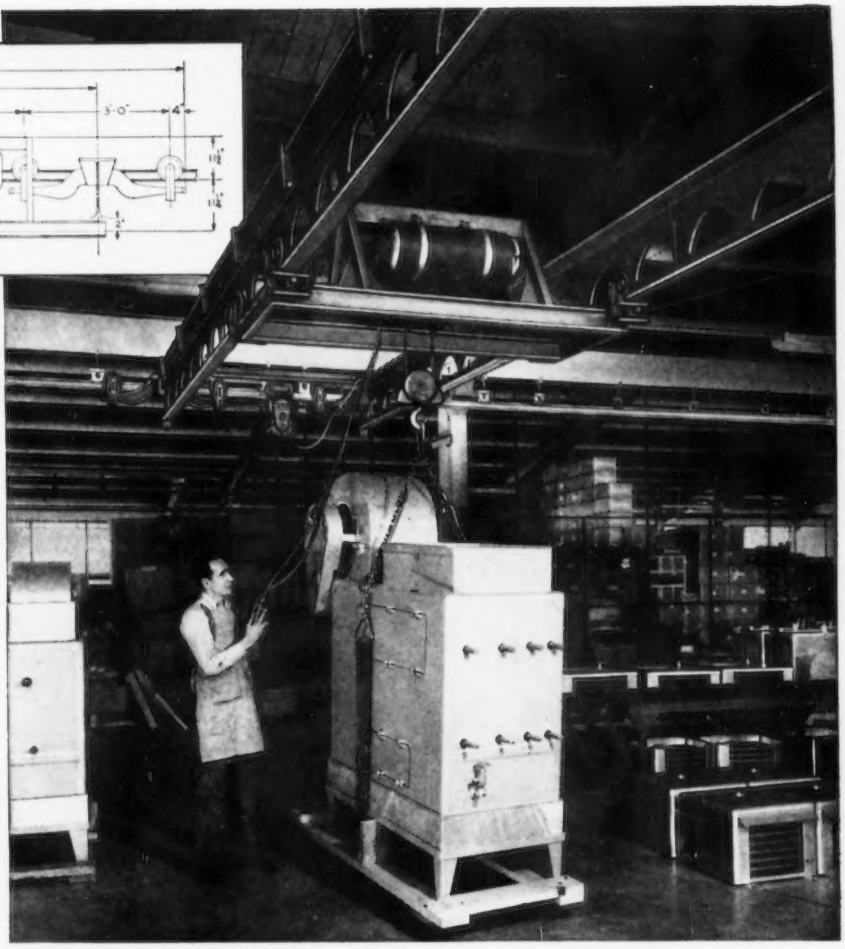

Lifting this three-ton condenser and moving it about is made an easy one-man job with the Tramrail crane.

HIGH LIFT UNDER LOW ROOF *Solves Handling Problem*

A double-girder, high-lift Cleveland Tramrail crane proved the solution of a handling problem at The Refrigeration Engineering Co., Los Angeles, Calif., manufacturers of evaporators and condensers of all sizes up to 100-ton rating.

Because many of their units are high and heavy, and the roof is very low, it was necessary to develop a special crane design that permits utilizing space between the crane girders. How well this was engineered is evidenced by the fact that while the distance from floor to the low part of the roof truss is only 11'-10¼", the hoist hook can be raised 10'-0" above the floor.

The crane and hoist are motor-driven, push-button controlled. The trolley is hand-propelled. The hoist has a capacity of three tons and travels at 18 feet per minute.

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THE CLEVELAND CRANE & ENGINEERING CO.
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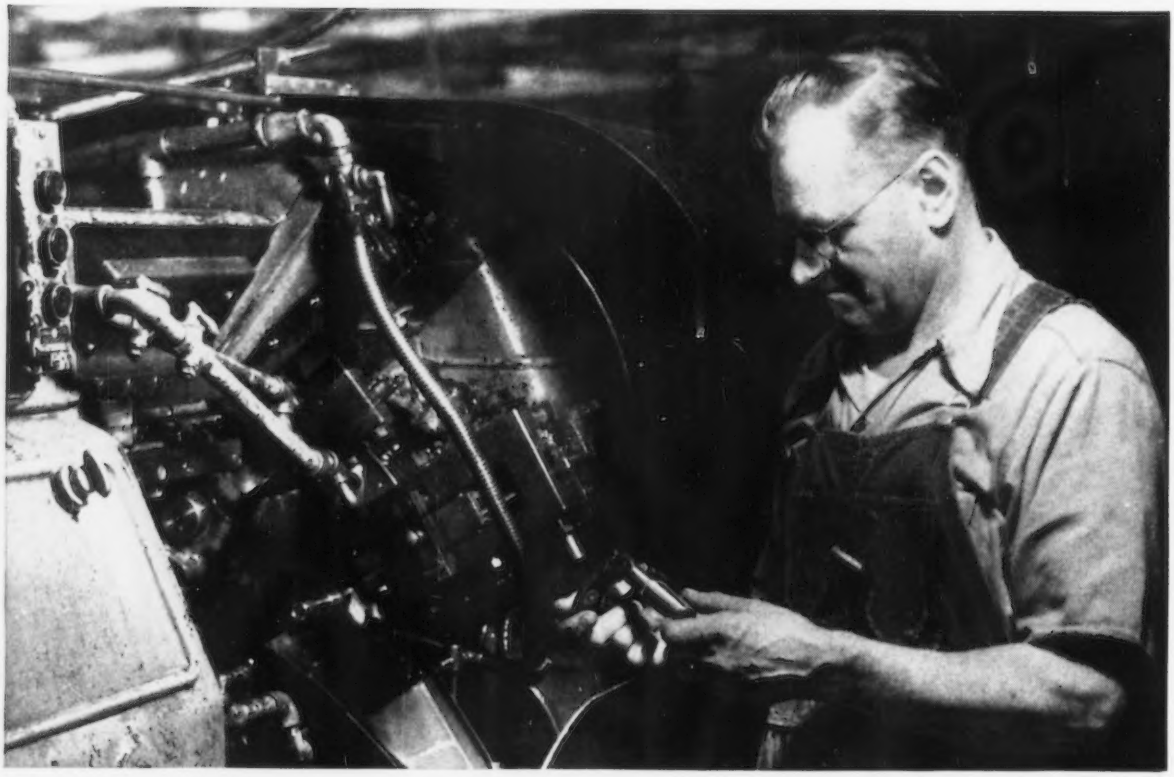
CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

IF YOU MACHINE STAINLESS STEEL



REPUBLIC COLD DRAWN LEADED ALLOY STEELS have helped Han-Kor Inc. of Cleveland, Ohio realize significant tool savings in mass producing electric motor commutators such as those shown above. Because each commutator is simply pressed onto its motor shaft, the center hole in the steel hub must be virtually perfect. Pull broaches used for this operation lasted for only 25,000 pieces when ordinary steel was used. Several years ago Han-kor switched to leaded steel and, since that time, no broaches have required replacement. Republic Cold Drawn Leaded Alloy and Carbon Steels may provide savings in time and money in your operations. Send coupon for more information.

REPUBLIC WEDGE-LOCK STEEL SHELVING is the world's strongest. And it actually gains strength as weight increases. Wedge-Lock is specifically designed for high stacking of such heavy items as dies and tools. It provides maximum loading in minimum floor space. There's no sagging, swaying or buckling. It can be assembled quickly and easily and is completely flexible to meet changing requirements. A shelving expert will help you plan your shelving arrangement.

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World's Widest Range of Standard Steels

PARTS...

You'll Want Republic's FREE BOOK

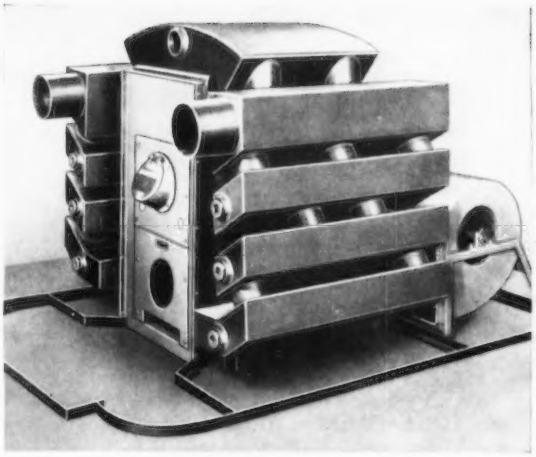
Do you know what causes tools to heat and burn, chatter marks, tapped holes to vary in size, rough threads, tooth breakage, burnished surfaces? Or what feed and speed to use when twist drilling .250 holes in A.I.S.I. 430-F?

The answers to these and many other questions are contained in Republic's *free book,* "How To Machine ENDURO Stainless Steel Bars".

This 96-page, pocket-sized manual is planned to help you obtain the best possible results when machining ENDURO bars. One section contains precise, accurate information on the basic principles of machining and how to correct troubles. Another section explains types and properties of stainless. Forty-two pages are devoted to estimating-tables covering conversion of fractional inches to decimals and millimeters, stock required for 1000 pieces, r.p.m. of spindles at given surface speeds, etc.

If you machine stainless steel parts you'll like this book. You will also like Free-Machining ENDURO® Bars. Here is a metal unsurpassed in high physical and chemical properties to which has been added the advantages of cold drawing: accuracy of section, close tolerance, uniform soundness and a fine surface finish. Two grades, A.I.S.I. Types 416 and 430-F are fully 90% as machinable as Bessemer screw stock. Republic also supplies ENDURO in hot rolled bars, special sections and wire.

Our metallurgists and machining specialists will give you expert, obligation-free assistance on application, processing and use. Just send the coupon if you would like one to call, or for your copy of, "How To Machine ENDURO Stainless Steel Bars".



REPUBLIC ELECTRUNITE® MECHANICAL TUBING provides safe, gas-tight joints required by the down-flow construction of this year-round furnace and air-conditioning unit. Uniform diameter, wall thickness, concentricity, strength, and ductility of ELECTRUNITE simplify design and help speed output of superior parts. Quality control from ore to finished tubing assures long, trouble-free service. Available in carbon and stainless steels.

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Send more information on:
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TO REDUCE WELDING COSTS *JETWELD IT!*

Lincoln Jetweld iron-powder electrodes increase welding speeds as much as 50%. Higher welding currents, greater deposition rate, and self-cleaning characteristics make possible drastic reductions in welding labor costs.

Weld appearance is smoother, approaching the bead quality of an automatic weld.

The Lincoln Jetweld family of iron-powder electrodes is available in four different classifications to meet a wide variety of welding requirements.

E-6024 Jetweld 1 for extra-fast welding of flat and horizontal fillet with AC or DC.

E-6027 Jetweld 2 especially well-suited for deep groove butt welds in the flat position.

E-6016 Jetweld LH-70 for all-position welding of all steels and for welding steels of poor weldability.

E-7020 Jetweld 2-HT . . . for high-tensile deep groove butt welds and fillets in flat position.

For complete information on Jetwelding or the Jetweld electrodes, write for Bulletin SB-1351.

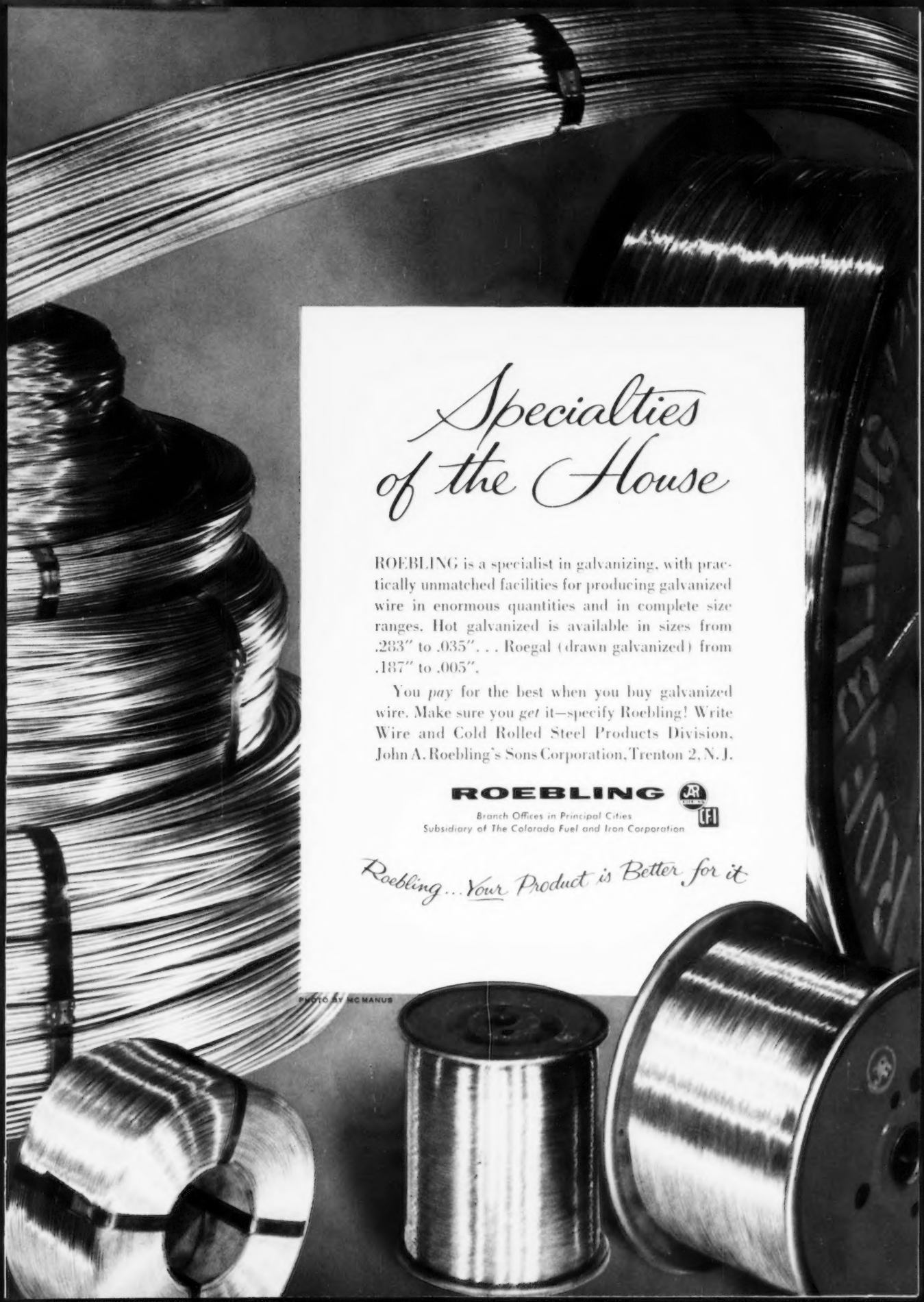
THE LINCOLN ELECTRIC COMPANY

Dept. 1536, Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

When Jetweld electrodes **H**ave higher deposition rates **Y**et give easiest operating qualities

WHY use anything but Jetweld



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ROEBLING is a specialist in galvanizing, with practically unmatched facilities for producing galvanized wire in enormous quantities and in complete size ranges. Hot galvanized is available in sizes from .283″ to .035″. . . Roegal (drawn galvanized) from .187″ to .005″.

You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, N. J.

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Roebling... Your Product is Better for it

PHOTO BY MC MANUS

Relieves traffic congestion. To handle the ten million cars a year which now funnel onto the 3-lane Carquinez Bridge, (right) the State of California is building this second bridge connecting the San Francisco Bay area and the Sacramento Valley. Use of nickel-containing USS "T-1" Steel in critical truss members has simplified design...reduced unnecessary weight...saved money.

A tale of two bridges ...and an $800,000 saving

Twins? *Almost.*

But there are two differences. The span on the right is 30 years old. Her sister is brand new.

Another big difference is in their construction materials. The most highly stressed truss members of the new bridge are USS "T-1" Steel . . . a high yield strength constructional alloy steel containing nickel.

"T-1"*, produced by United States Steel Corporation, has nearly three times the yield strength of structural carbon steel. It is at least four times as resistant to atmospheric corrosion. And it can be welded with relative ease.

It reduces weight and simplifies design.

According to computations by the State of California, "T-1" Steel will save approximately $800,000 in construction costs.

Are *you* looking *for* weight saving . . . added corrosion resistance . . . dependable strength? A nickel alloyed steel may be just what's needed to improve whatever you're making or building. Let us help you find out. Here at Inco, you can get counsel and data based on years of specialized experience with alloys containing nickel.

* "T-1" is a registered trademark of United States Steel Corporation. "T-1" Steel is produced by United States Steel Corporation and its licensee, the Lukens Steel Company.

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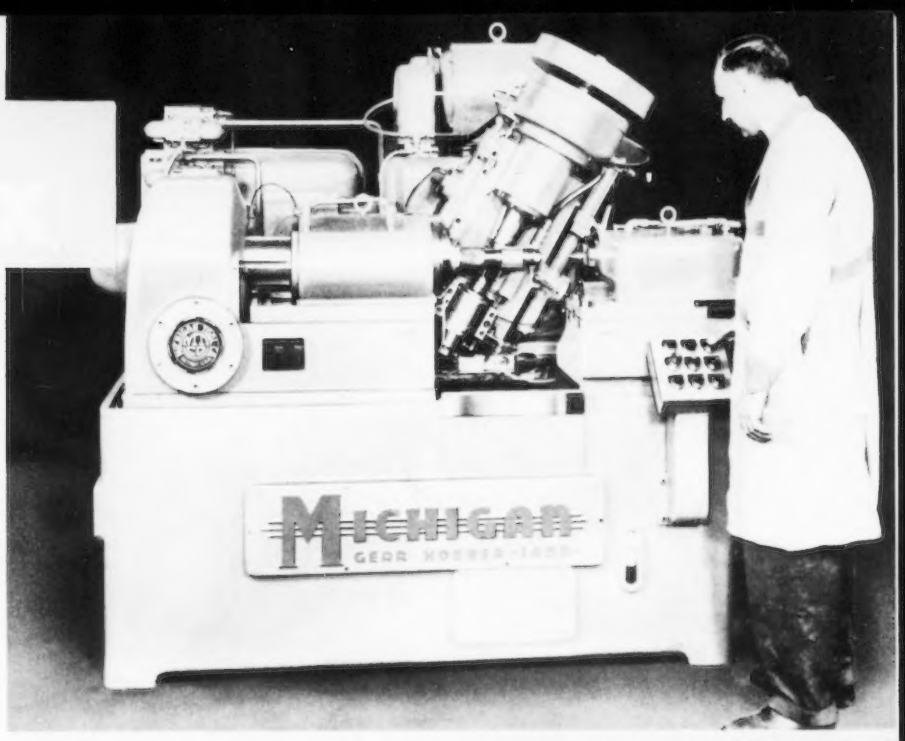
INCO NICKEL

NICKEL ALLOYS PERFORM BETTER, LONGER

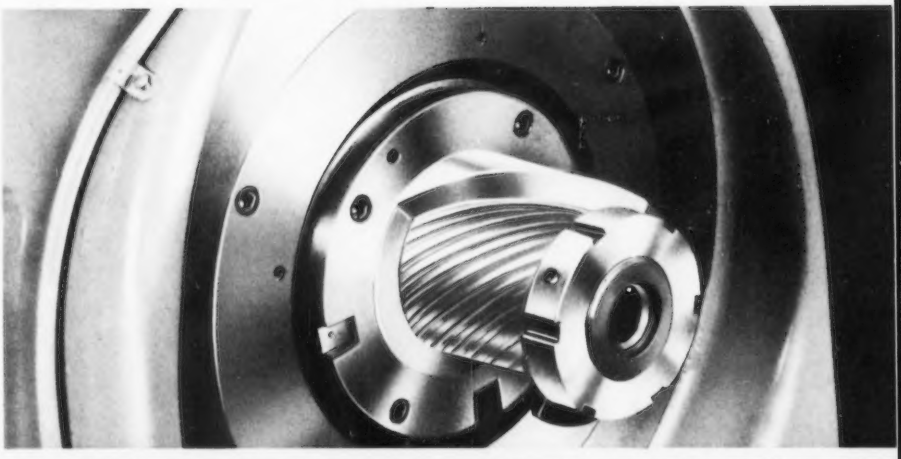
UP YOUR GEAR OUTPUT RATE WITH THESE NEW HIGH-SPEED HOBBERS

You can't beat these new horizontal single-spindle gear hobbers for versatility, speed, productivity and capacity. Michigan's latest — Model 1458-B—has a cutting cycle measured in seconds. It is completely automatic. Designed for either conventional or climb hobbing. Center distance—hob arbor to work spindle —is 8 inches. Hobs up to 4-pitch spur or helical gears. Maximum crossfeed stroke of hob is 5 inches. Write for descriptive literature.



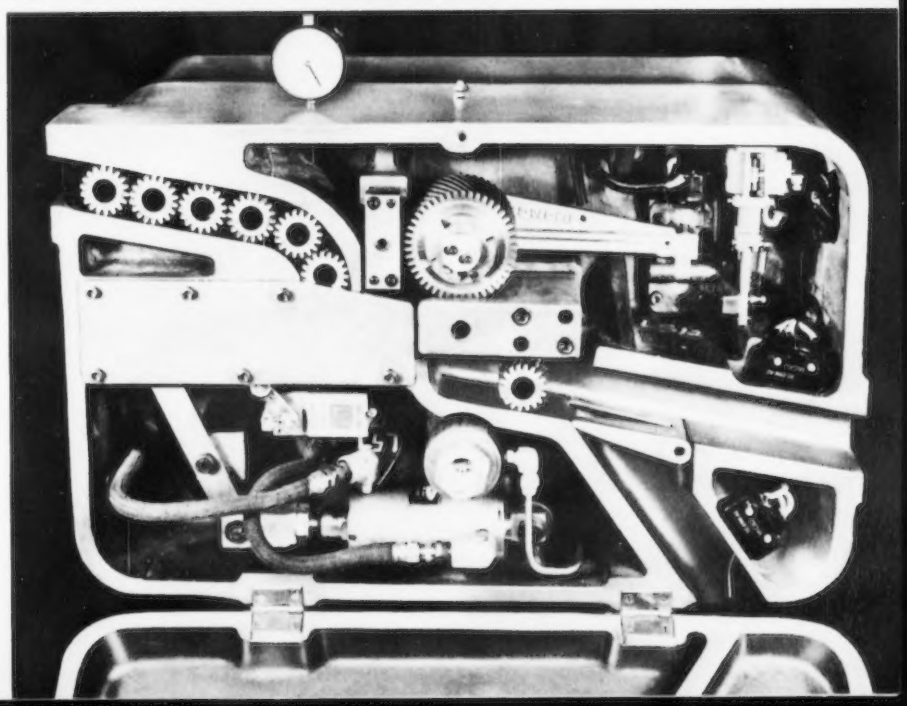
NEW GUIDE GIVES CLOSE LEAD CONTROL

An inboard-mounted guide assembly on the 1458-B controls the helix angle being cut (R or L up to 35) by introducing lead to the work spindle, thus eliminating change gears for controlling lead. Other features: standard conventional approach; optional "plunge-feed" approach, available where suitable for shortest time cycles. Of exceptional rigidity, Michigan's new hobber is of "unitized" construction — all assemblies being mounted on a common surface.



A MICHIGAN EXCLUSIVE— AN AUTOMATIC GEAR CONCENTRICITY CHECKER

Now available—a unit that 100% inspects spur or helical gears for concentricity in a checking time of only 6 seconds! The checker automatically monitors and classifies. Tolerances are completely variable. Parts are rotated against a master gear in two directions, checked, and passed—rejects are shunted from process. Engineered in sizes to suit large or small gears. Send for details on Michigan's complete line of gear analysis equipment.



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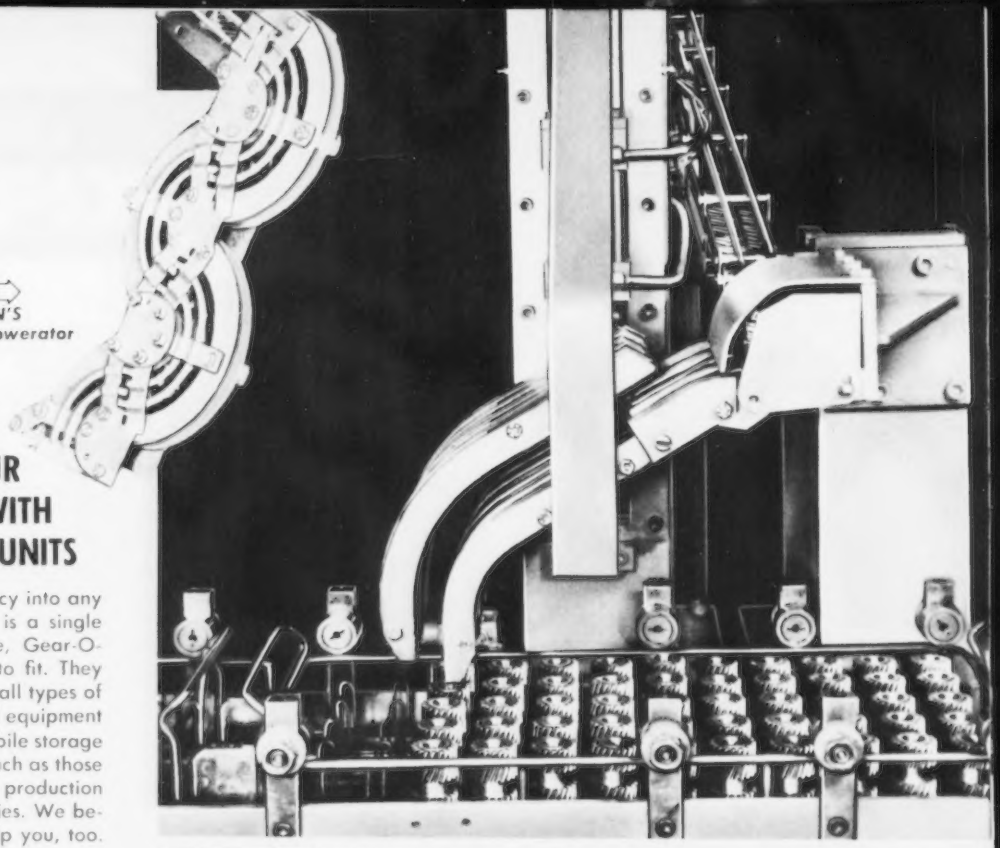
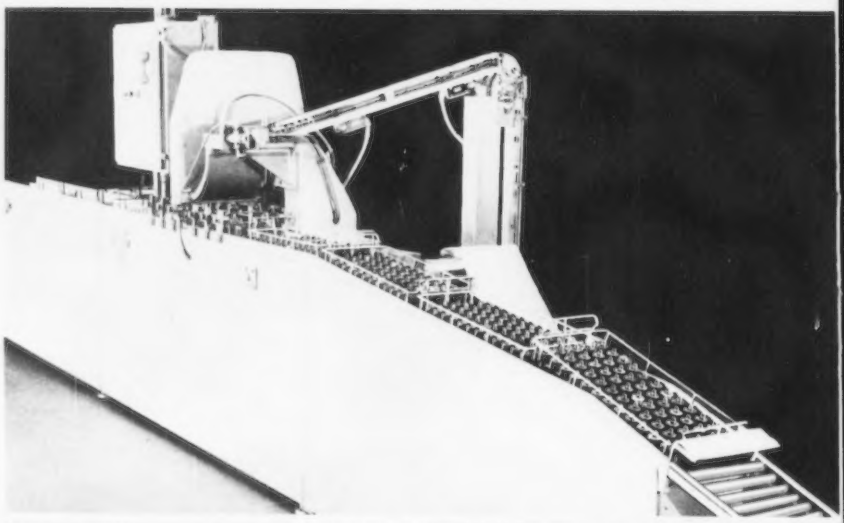


GEAR-O-MATION'S
"Velvet-Drop" Parts Lowerator

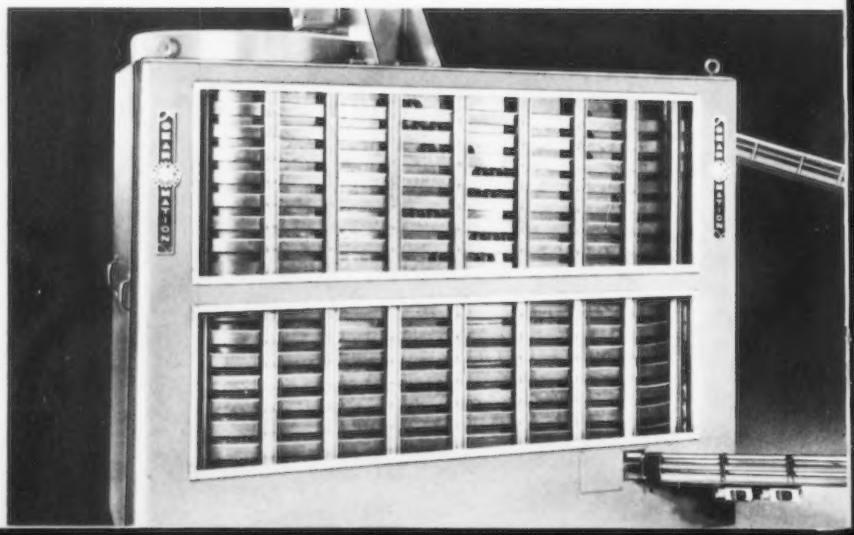
SIMPLIFY YOUR AUTOMATION WITH GEAR-O-MATION UNITS

Now you can put top efficiency into any automatic setup. Whether it is a single machine or a complete line, Gear-O-Mation has functional units to fit. They not only handle and transfer all types of parts but also serve as control equipment for directional movement, mobile storage and demand feeding. Units such as those shown here are controlling production cost patterns in many industries. We believe Gear-O-Mation can help you, too. Write for full details.



BASKET LOAD YOUR PARTS FASTER

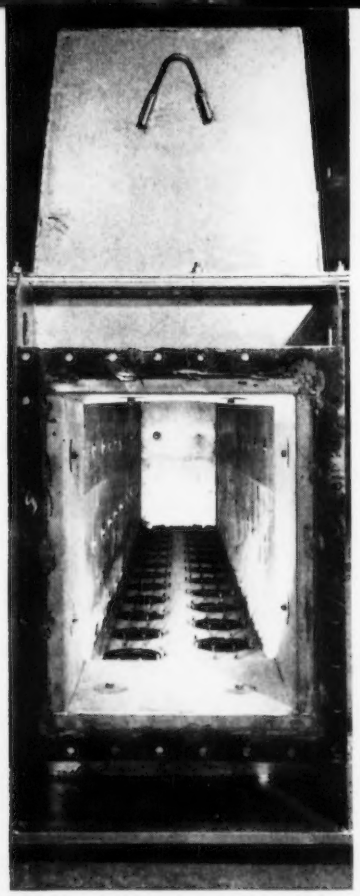
Basket loading need not be a processing bottleneck. Gear-O-Mation's basket loader does it automatically. Assembled from standard components to suit your parts. Middle photo shows loading of center-bored pinions at 3000 per hour. In upper right photo you can see how parts drop onto upright basket prongs a full row at a time. Send for bulletin GO-568.



HIGH-CAPACITY PARTS BANK STORES AND FEEDS

A new Gear-O-Mation storage unit (at right) is for parts that can roll. Parts are gently propelled up a slightly inclined, continuous track as they lean against a slowly revolving, continuous belt. Unit provides true demand feed from active storage. Typical capacity is 2500 blanks 2 inches OD. In continuous operation you can feed 5000 parts an hour. Write for additional information.

GEAR-O-MATION
DIVISION OF MICHIGAN TOOL COMPANY
7171 E. McNICHOLS RD. • DETROIT 12, MICH.

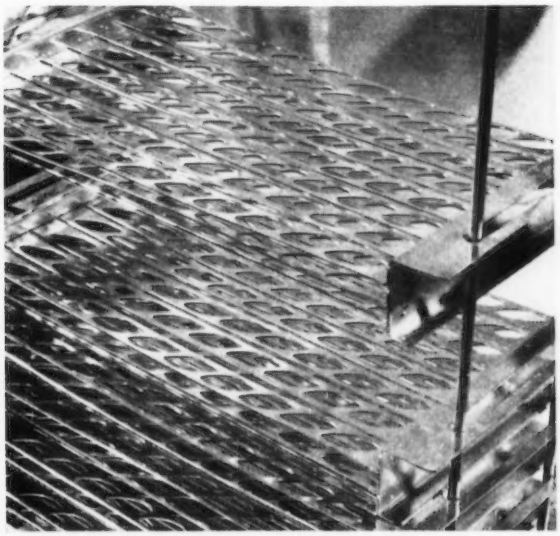


NOTHING can equal Stainless Steel

in its unique combination of properties

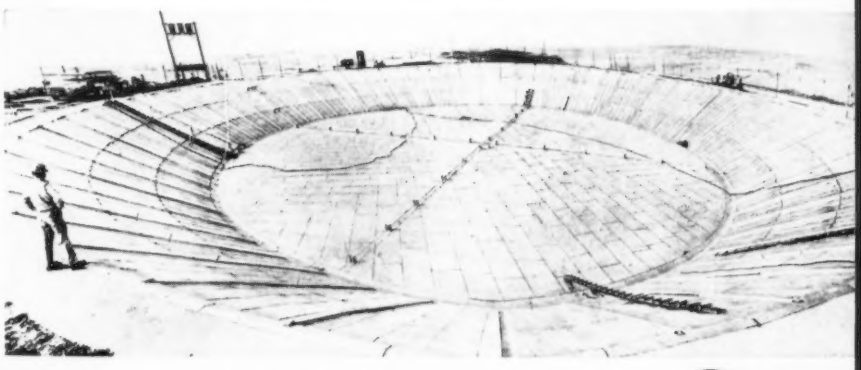
No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength, hardness, beauty, cleanability and easy fabrication. For a reliable source of supply, United States Steel offers you the widest range of types, finishes and sizes. **Just call your steel warehouse.**

For High Temperatures. This recuperator is used on industrial furnaces. It uses waste flue gas to heat the incoming furnace air and thereby increase the efficiency of the furnace. Formerly, these recuperators were made with ceramic tubes, but heat transfer was low and leakage was high. The Hazen Engineering Company in Pittsburgh makes recuperators almost completely from Stainless Steel. Compared to ceramic designs, the Stainless design saves about 40% in fuel, increases furnace output about 10%-15%. The Stainless Steel performs well, even at this 1800-2300° F. temperature range.



For Cleanliness. When you work near nuclear radiation areas, you wear a small badge containing X-ray film that records how much radiation you have received. The film, "photodosimetric film," is developed in a Sensitometric Processing Unit made by Bar-Ray Products, Inc., in Brooklyn. The unit, including the trays shown here, is made completely from 18-gage Type 316 Stainless Steel because it resists corrosion, is easy to clean, has a hard, dense surface that doesn't harbor dirt.

For Corrosion Resistance. The Hercules Powder Company needed an ammonium nitrate storage tank for their plant near Richmond, California. They took an old, World War I concrete reservoir and lined it with Type 304 USS Stainless Steel. The 14-gage sheets are laced with 18,000 feet of vacuum-tested welds. Tank holds two **million** gallons of solution, and is 200 feet in diameter at the top. U. S. Steel's Consolidated Western Division handled the complete installation.



United States Steel Corporation, Pittsburgh • American Steel & Wire Division, Cleveland
Columbia-Geneva Steel Division, San Francisco • National Tube Division, Pittsburgh
Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Supply Division, Warehouse Distributors
United States Steel Export Company, New York

USS STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS

UNITED STATES STEEL

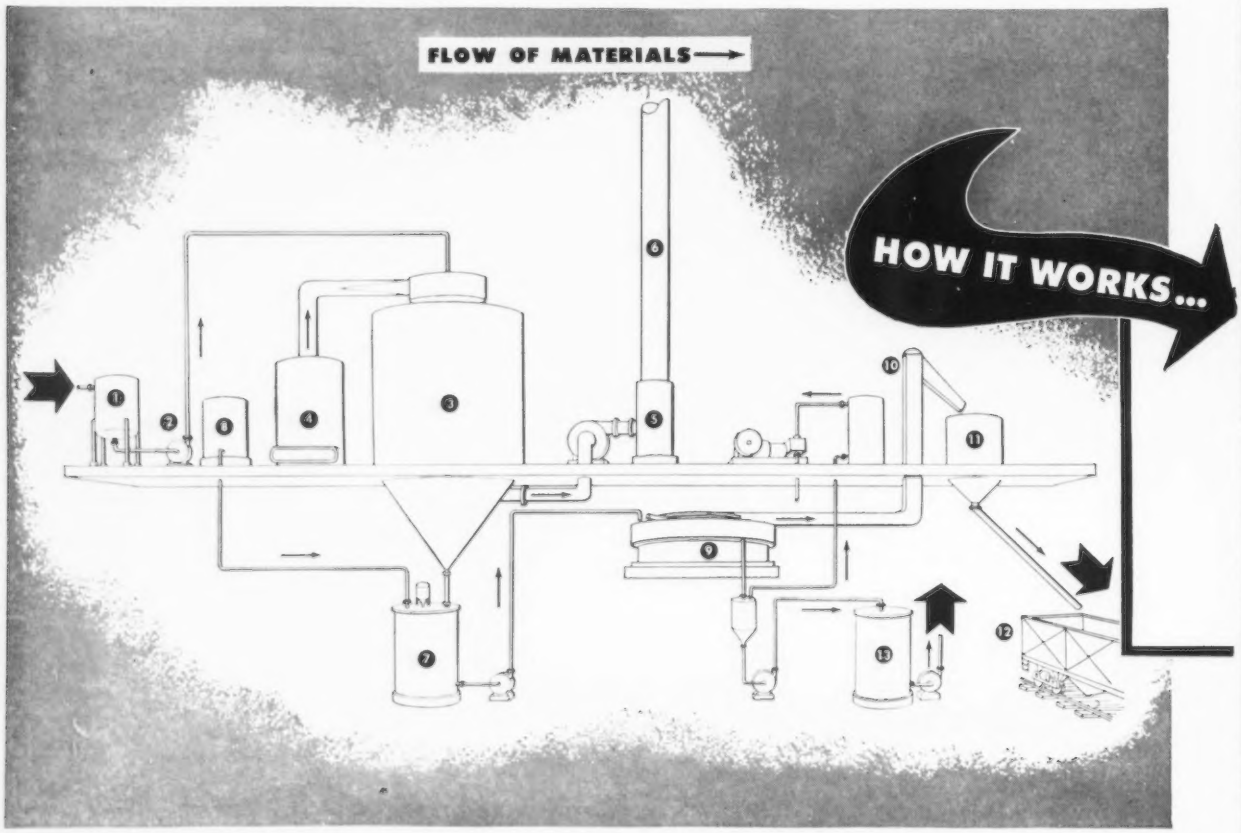
If you operate a

CUT ACID REQUIREMENTS

New continuous process, available from Koppers, of pickling acid used . . . and eliminates waste

FOR OVER A QUARTER OF A CENTURY, wherever a pickling line has been in operation, disposal of spent liquor has been a major headache. But now a new continuous regeneration process—the Koppers Inland-Zahn process— goes a long way toward solving this problem. This system is simple, it is economical, and *it has been proved in actual plant-scale commercial operation in Europe.*

With this process, the only make-up acid needed is the amount consumed in the pickling reaction plus normal losses. *All* available free acid in the used liquor is recovered (up to 50% of the original charge). Labor costs are low—just one man can operate the entire regeneration plant. As a result of these savings, operating costs are substantially below those of any presently available disposal method.



pickling line

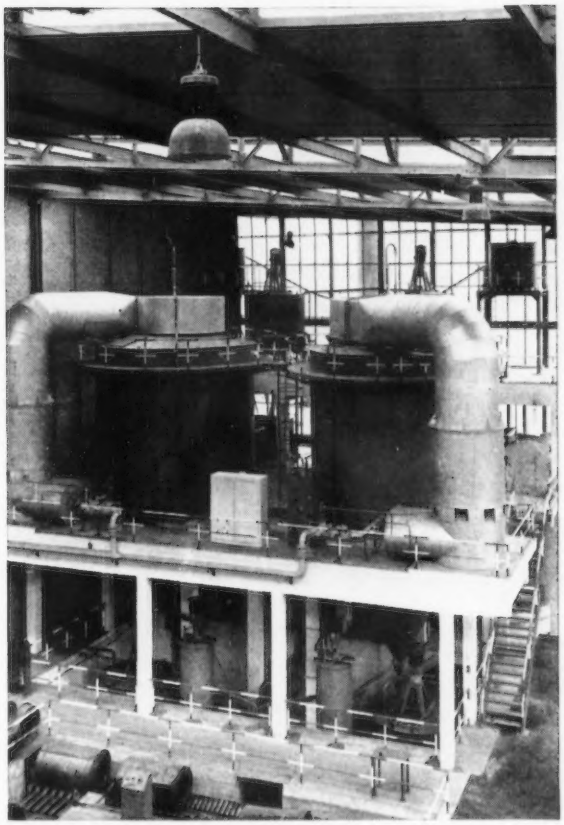
IN HALF!

regenerates up to half liquor disposal problem

PROVED COMMERCIALLY—This process, developed by Inland Steel Company and adapted commercially by Zahn & Co. of West Germany, is now being used successfully in three European steel plants. The benefits achieved include *extremely low maintenance* . . . and more uniform and *higher* acid concentrations in the baths. The latter advantage permits faster steel processing.

NEUTRALIZING PLANTS – The new regeneration process is especially applicable to plants handling 10,000 gallons of effluent, or more, a day. The Chemical Department of Koppers Engineering and Construction Division also designs and builds lime neutralization systems for both large and small pickling operations. Send the coupon for complete information about these and other Koppers Chemical Engineering Services.

Spent pickle liquor (1) is pumped (2) to spray head in an evaporating chamber (3). Here, hot air and flue gases from a combustion chamber (4) concentrate the liquor and cause the ferrous sulfate monohydrate to crystallize out of solution. Vapor laden air is discharged to atmosphere through a mist eliminator and stack (5 and 6). The slurry is dropped into a crystallizing tank (7) where fresh sulfuric acid is added from a metering tank (8). This causes more monohydrate to drop out. The slurry is then separated in a vacuum filter (9) and washed. Salt is conveyed to bins or hopper cars for sale or disposal (10, 11, 12). Mother liquor, containing about 35% acid and 1-2% iron, is pumped to a holding tank (13), ready for dilution and return to the pickling tanks. No reheating is required.



HEART OF THE SYSTEM—This spray dryer concentrates spent liquor to slurry of ferrous sulfate monohydrate crystals suspended in acid. The plant shown here, in Germany, has operated since June, 1954, processing 48,000 gallons per day of waste liquor.

GET ALL THE FACTS!

Koppers Company, Inc.
Engineering and Construction Division
1452 Koppers Building
Pittsburgh 19, Pennsylvania

I would like to receive literature on this new pickle liquor regeneration process . . . and also on Koppers other chemical engineering services. Please send the following:

- ☐ **Regeneration of steel pickling solutions by Koppers Inland-Zahn process.**
- ☐ **Lime neutralization of spent pickle liquor by Koppers.**
- ☐ **"3 Keys to Selecting Your Industrial Contractor," a brochure describing the variety of Koppers construction services and giving reasons why Koppers should build your next chemical plant.**

Name _____

Title _____

Firm _____

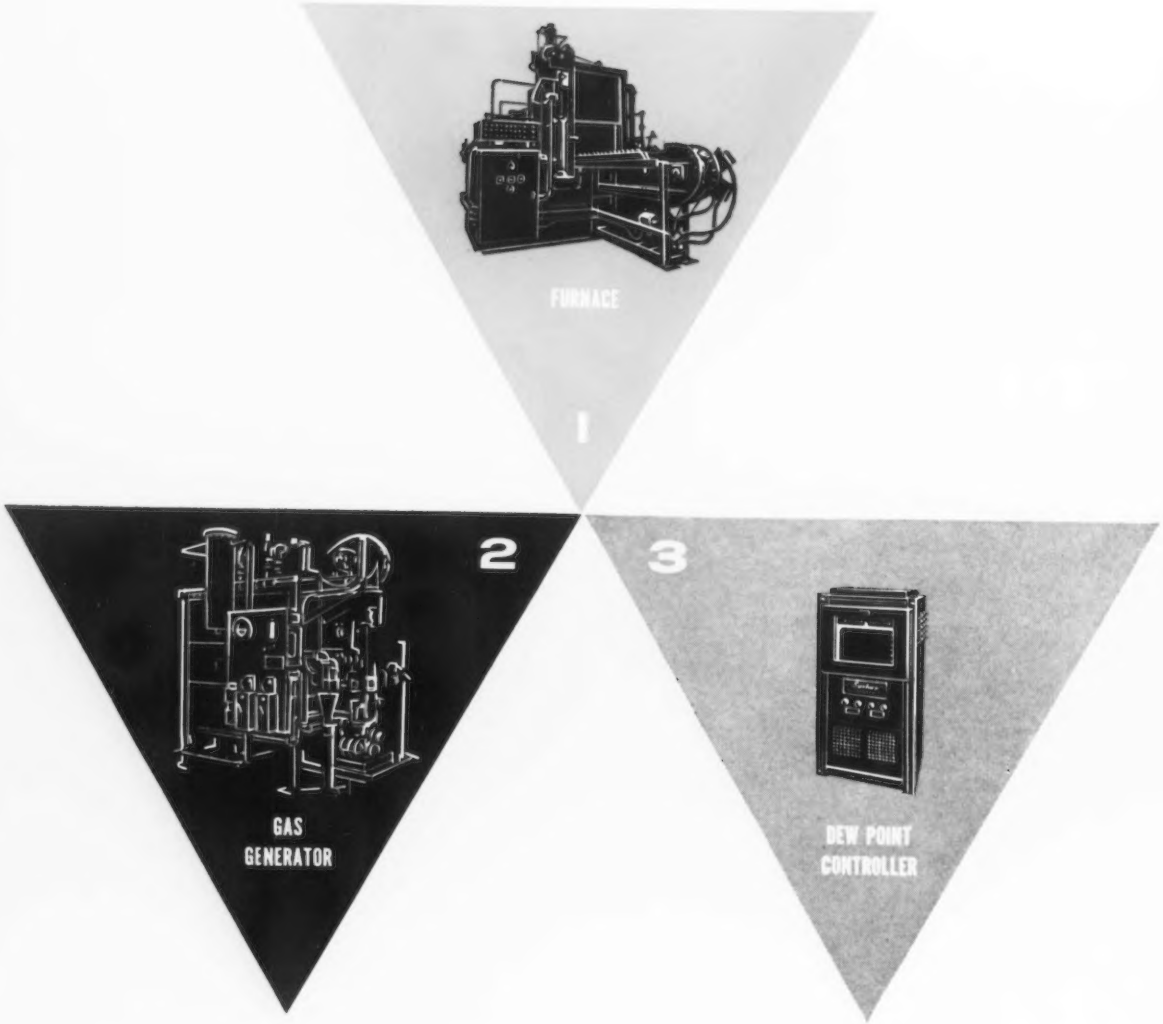
Address _____

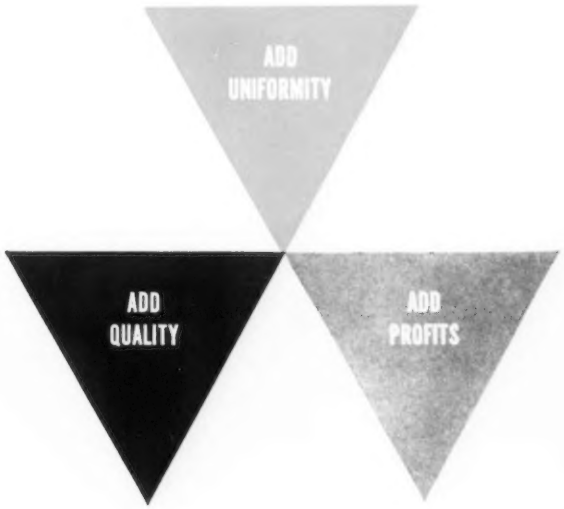
City _____ State _____

KOPPERS

KOPPERS

CHEMICAL ENGINEERING SERVICES


FURNACE
1
2
GAS
GENERATOR
3
DEW POINT
CONTROLLER



UPGRADE STEELS AND PROFITS WITH SURFACE INTEGRATED GAS CHEMISTRY

You can upgrade low-cost steels, and protect metal surfaces to cut cleaning costs with Surface gas chemistry. You can tailor the chemical composition and the physical properties of your metal surface exactly to order.

The process is controllable by instrumentation, and can be easily applied to either batch or in-line operations.

If you use endothermic atmospheres, Surface can supply you a completely integrated system consisting of (1) furnace, (2) atmosphere generator, and (3) controls. Designed to work together, these elements can be as automatic as you want them.

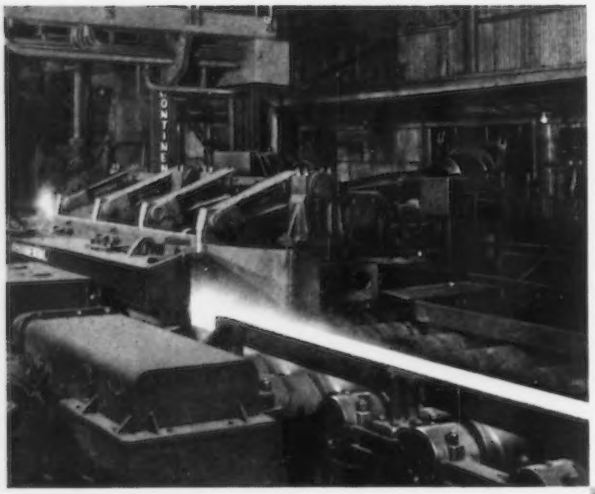
You can improve your profit atmosphere by applying Surface gas chemistry to your heat treating operations. It will reduce costs, improve product uniformity and quality, reduce or eliminate manual labor, and avoid waste disposal problems.

See how Surface gas chemistry has profited others; write for Bulletin SC-178.

Surface Combustion Corporation, 2373 Dorr St., Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

Surface®

wherever heat is used in industry

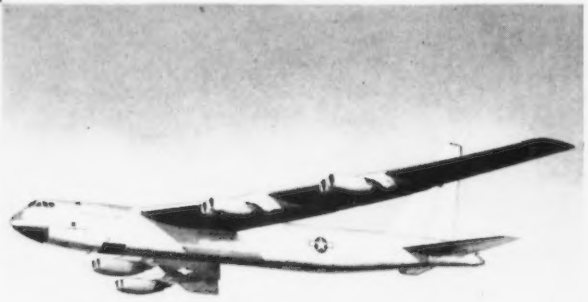


THE HEAVIER THE LOAD...

the more you need HYATTS . . . because for sheer load-carrying capacity in continuous service, straight cylindrical roller bearings have no equal. That's why leading steel mills use HYATT Hy-Rolls for dependability.

THE HIGHER THE SPEED...

the more you need HYATTS . . . because they're built with superior steels, scrupulous control of internal clearances and uncompromising inspections to assure smoother running, even at RPM's required in jet engines.



THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS

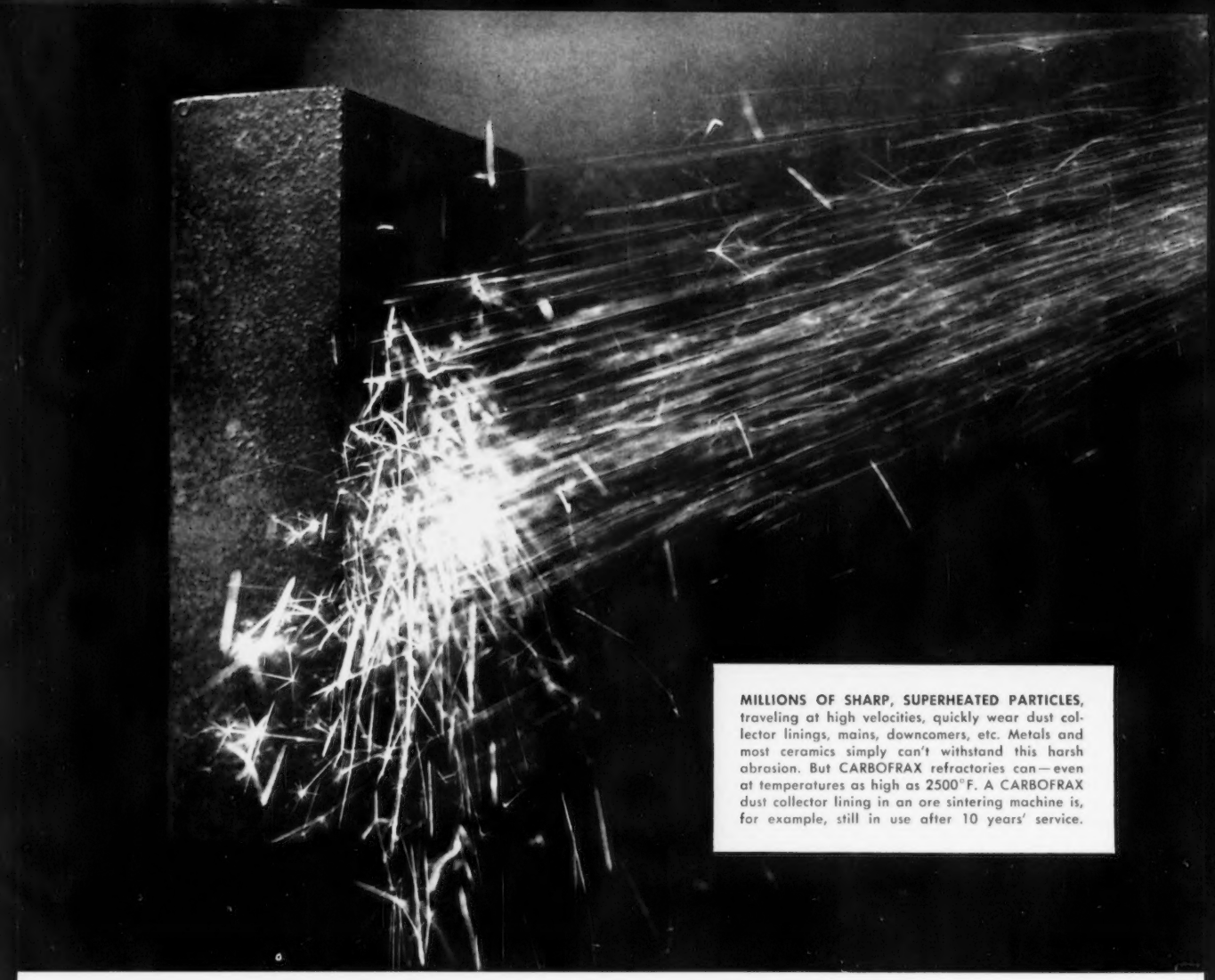
More and more, as loads and speeds edge upward and housings must often be reduced in size, design engineers are turning to HYATTS to help squeeze improved life/load ratings into limited space. Quality-built HYATT Hy-Rolls not only solve the problem of increased radial loads, but the shouldered-race types will take a surprising amount of thrust as well. Ask your nearest HYATT Sales Engineer for recommendations—he can be a mighty big help to you! Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.: Pittsburgh: Detroit: Chicago: and Oakland, California.

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

GM FORWARD FROM FIFTY

HYATT HY-ROLL BEARINGS

THE "WORKHORSES" OF MODERN INDUSTRY



MILLIONS OF SHARP, SUPERHEATED PARTICLES, traveling at high velocities, quickly wear dust collector linings, mains, downcomers, etc. Metals and most ceramics simply can't withstand this harsh abrasion. But CARBOFRAX refractories can—even at temperatures as high as 2500°F. A CARBOFRAX dust collector lining in an ore sintering machine is, for example, still in use after 10 years' service.

Refractories . . . to resist abrasion

Exceptional resistance to abrasion—whether caused by tiny gas-borne particles or sliding steel billets—is one of the most useful properties of several of Carborundum's unique refractory materials. For example, when used in the exhaust lines of gasoline catalytic cracking units in temperatures ranging up to 1200°F, these refractories lasted 3 years, as compared to alloy rings which lasted for 6 months.

And when abrasion is combined with higher temperature, the exceptional resistance of these super refractories becomes even more apparent and useful. As skid rails in furnaces which heat 6-lb. billets to 2250°F—pushing 250 slugs an hour—CARBOFRAX® silicon carbide refractories need one-third the replacement, one-third the labor and one-third the down-time of ordinary rammed chrome ore hearths. Other successful applications include: dust collectors, gas scrubbers, transfer pipe lines, hydro cyclones and process equipment parts, to name but a few.

Many applications call for other properties in combination with wear resistance. Among Carborundum's many materials are refractories that also offer excellent heat shock resistance with sufficient hot strength to withstand 25 psi at 3128°F. Others provide unique resistance to corrosion as well as abrasion. These properties are but a few of those to be found in super refractories pioneered by Carborundum. Among them, you are almost certain to find answers to your refractory and high-temperature problems. For help, fill in and mail this coupon:

CARBORUNDUM
Registered Trade Mark

----------MAIL THIS COUPON TODAY----------

Dept. B127, Refractories Division,
The Carborundum Company, Perth Amboy, N. J.

Please send me:

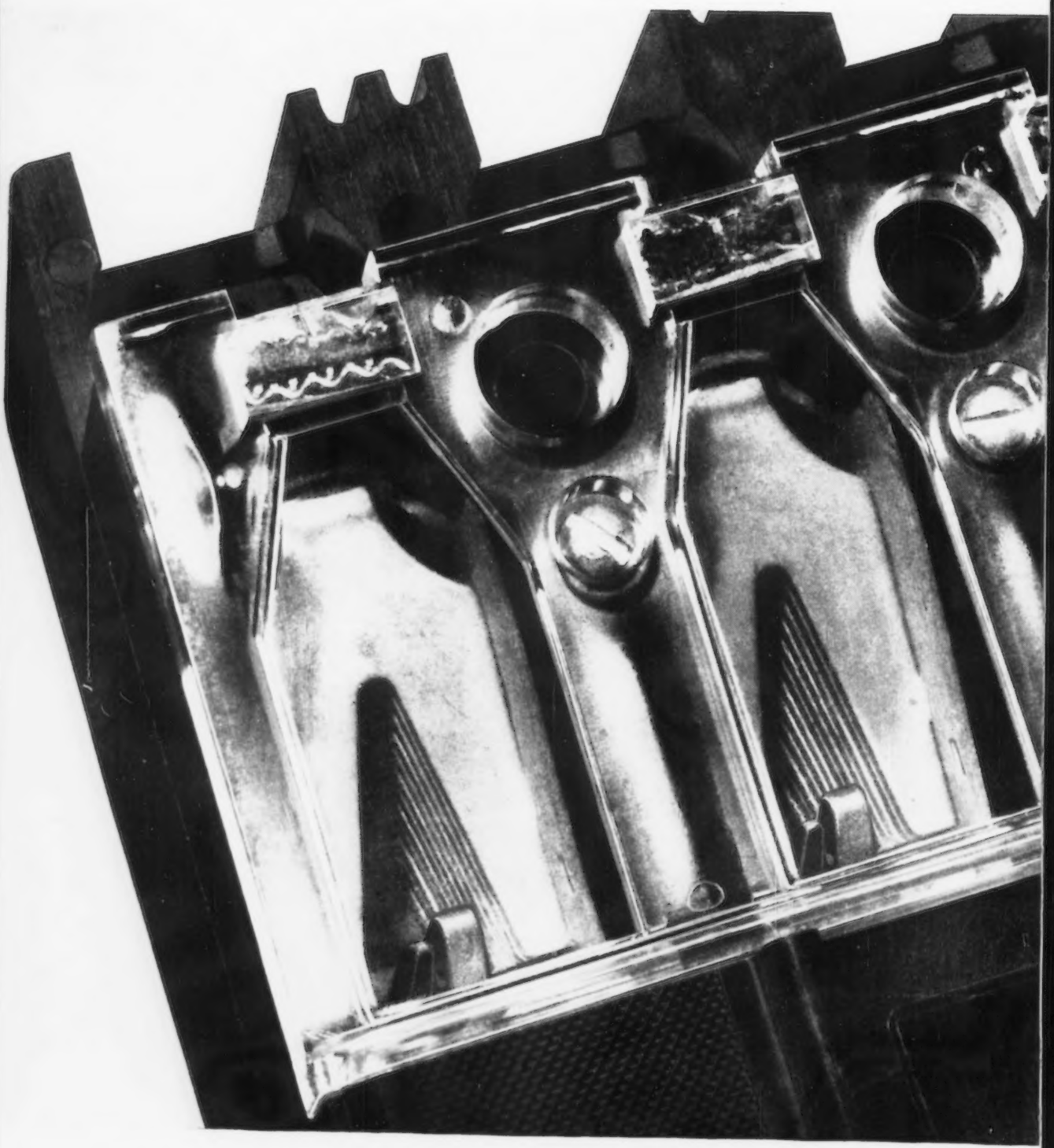
- ☐ Forthcoming issue of Refractories Magazine
- ☐ Bulletin on Properties of Carborundum's Super Refractories
- ☐ Here is a description of my high temperature problem. Can you help me?

Name _____ Title _____

Company _____

Street _____

City _____ Zone _____ State _____



World's First Breaker with the Contacts VISIBLE

Another First by Westinghouse

SAF-T-VUE

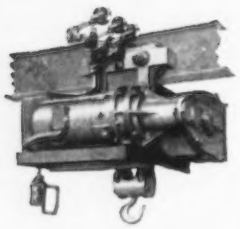
Breaker

Everyone who's seen this exciting new development has said "this is the biggest thing in circuit protection since the development of breakers . . . you're sure the contacts are open (or closed) because you can see through the transparent window."

Of course they're right, and in addition, Westinghouse Saf-T-Vue Breakers have the positive action, tested accuracy, long life and special features that engineers, manufacturers, electricians and contractors have depended upon for years. Now plants whose safety codes require that contacts be visible can use the most modern form of circuit protection.

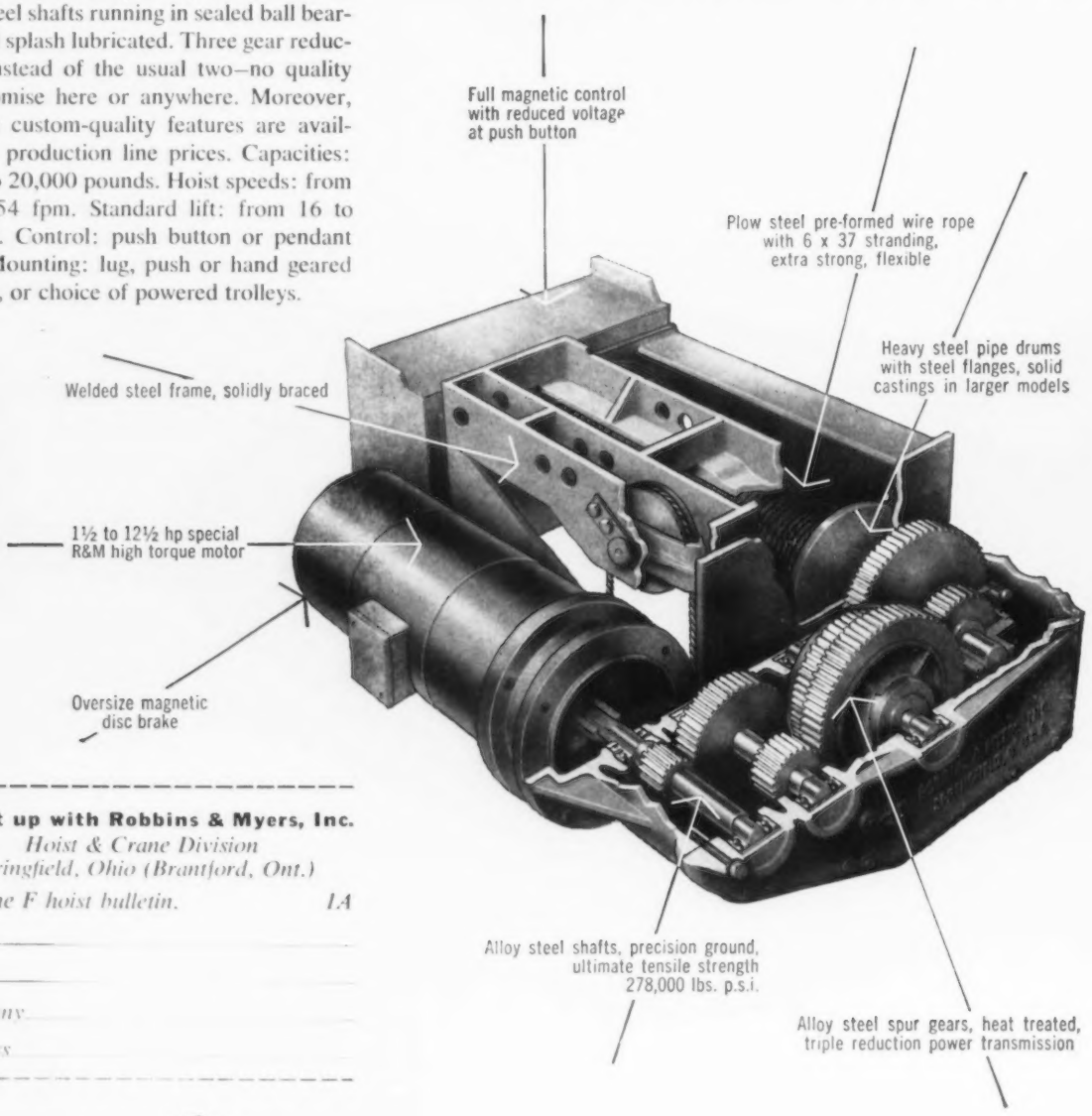
See your Westinghouse representative, or write Westinghouse Electric Corporation, Standard Control Division, Beaver, Pennsylvania. J-30286

YOU CAN BE SURE...IF IT'S Westinghouse



R&M F hoists cut down the cost of lifting but the F hoists save still more money. Dollars usually spent on maintenance become dollars earned because of the extra stamina built into each component. Look at the gearing—here are precision cut alloy steel spur gears, wide faced and heat treated for durability. They're mounted on alloy steel shafts running in sealed ball bearings, all splash lubricated. Three gear reductions instead of the usual two—no quality compromise here or anywhere. Moreover, F hoist custom-quality features are available at production line prices. Capacities: 1000 to 20,000 pounds. Hoist speeds: from 10 to 54 fpm. Standard lift: from 16 to 40 feet. Control: push button or pendant rope. Mounting: lug, push or hand geared trolleys, or choice of powered trolleys.

choose a hoist with extra stamina



take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)

Send me F hoist bulletin. *IA*

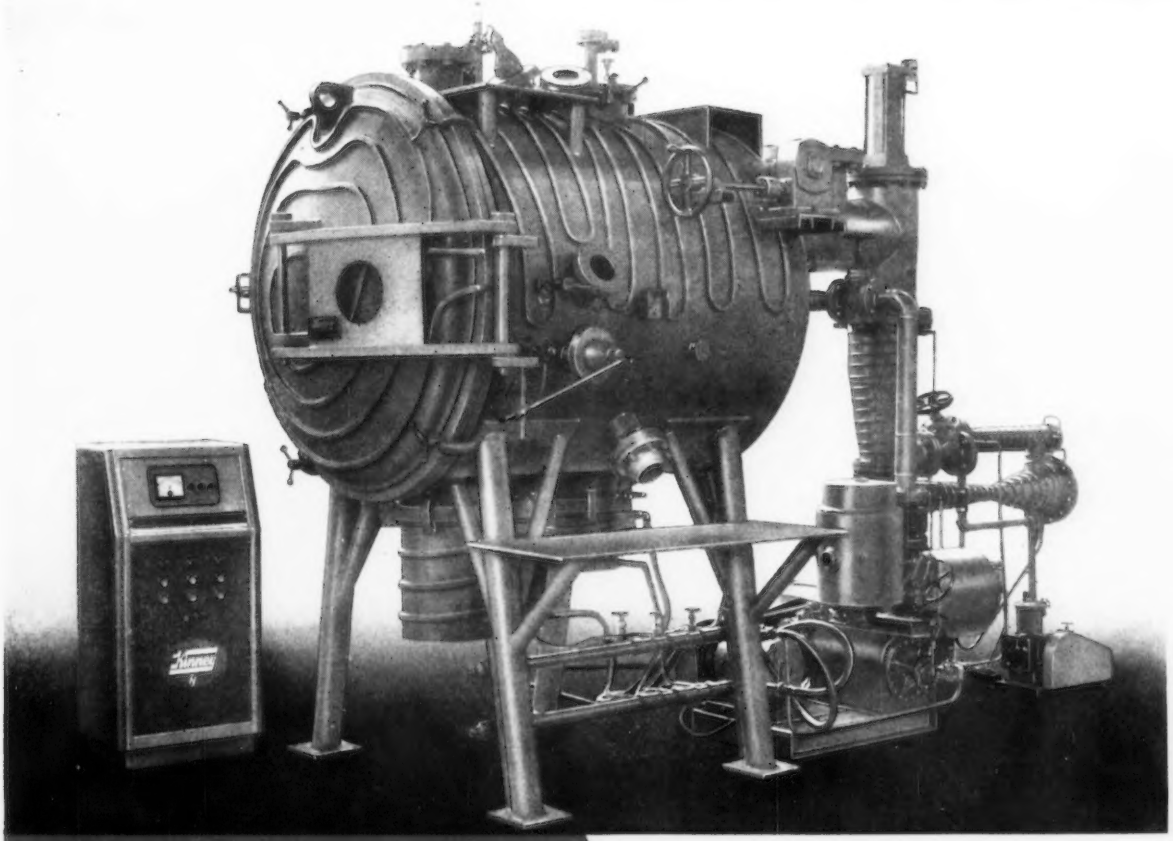
*Name*_____

*Title*_____

*Company*_____

*Address*_____

ROBBINS & MYERS **hoists • cranes • winches**



A NEW HIGH IN FURNACES FOR INDUCTION MELTING AND CASTING IN VACUUM

by Kinney®

New developments in KINNEY cold wall Furnaces feature *New High Vacuum, New High Temperatures* and *New High Volume*. The 300 lb. Melting and Casting Furnace, shown above, is an example of the advanced engineering that signalizes these KINNEY Furnaces.

This Furnace offers many unusual features. The crucible coil assembly is of unique design which, with minimum modification, can be used for lip or bottom pouring. Two water-cooled mold chambers are provided . . . an elongated one for lip pouring and a circular section chamber for bottom pouring. The illuminated process chamber has sight ports fitted with shields that permit a clear view for all stages of the process cycle. The crucible tilt mechanism is manually operated and a port located above the coil assembly provides the means for charging the crucible. Additional ports are provided for instrumentation and accessories such as: devices for adding alloying materials, vibrator feeds, and arc hot topping of cast ingots.

The pumping system is arranged so that a twin furnace application can subsequently be effected at minimum cost.

WRITE:

Detailed information on KINNEY High Vacuum Furnaces to better meet your requirements is FREE for the asking. Write today.

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3634M WASHINGTON STREET • BOSTON 30 • MASS.

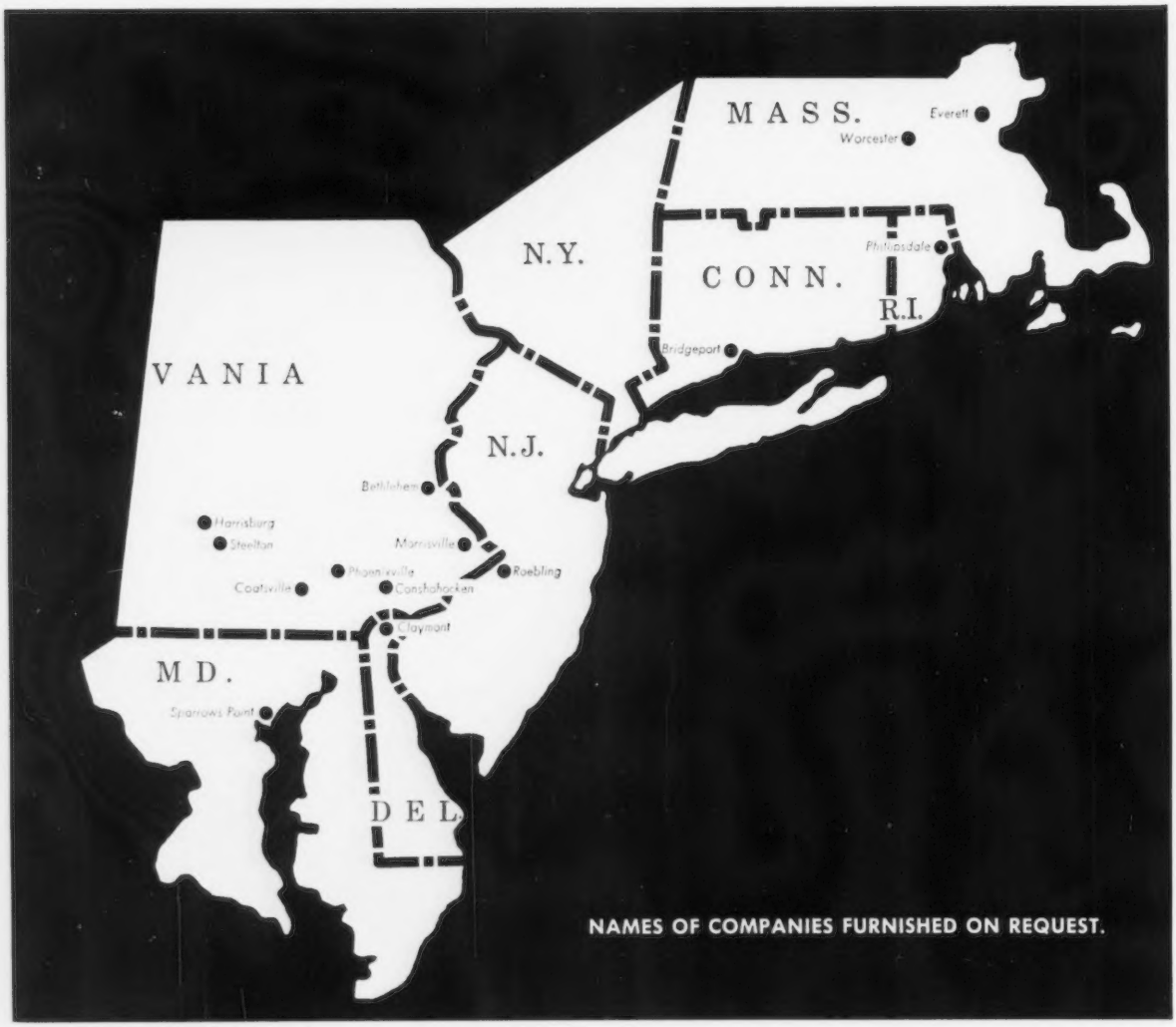
Please send me information on advanced design KINNEY Furnaces for ☐ Melting ☐ Sintering ☐ Welding ☐ Brazing ☐ Annealing.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____



Permanente #165 was chosen for 74 out of the last 90 rammed furnace bottoms installed in this area! Reasons: longer life, fewer repairs, less down time . . . advantages pioneered by—

For complete information,
ask for valuable installation manual "Permanente 165 and 84 Ramming Mixes for Open Hearth Furnaces."

Call or write Kaiser Chemicals Division, Dept. R-7161, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
HAMMOND, IND. . . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

KAISER CHEMICALS

PIONEERS IN MODERN BASIC REFRACTORIES

REFRACTORY BRICK AND RAMMING MATERIALS • CASTABLES & MORTARS
MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

These two 600 pound TOCCO melting furnaces are powered by a 200 KW, 3000 cycle TOCCO motor generator set.

TOCCO* Induction Melting "Delivers"— In Two Days Instead of Two Months!

Casting backlogs at Commercial Shearing and Stamping Co. in Youngstown, Ohio, used to lag from 8 to 10 weeks behind production schedules. By installing four 600 pound TOCCO melting furnaces this firm upped daily melting capacity to 28,000 pounds. Now orders can be shipped in 48 to 72 hours.

In a foundry occupying less than 8000 square feet of space, production of castings jumped between 40% and 50%; tensile strength of alloy castings was boosted from 35,000 to 50,000 p.s.i. Substantial savings in the cost of castings have resulted. Moreover, with precision casting and molding on a push-button basis, many former drilling and roughing operations were completely eliminated.

Many firms have discovered that TOCCO Induction Melting insures maximum quality control, increased volume and lower operating costs—foundry premiums directly linked to TOCCO's rapid melting, simplicity of operation, low alloy loss, constant burn off and pinpoint quality control.

THE OHIO CRANKSHAFT COMPANY

TOCCO

*Trade Mark Reg. U. S. Pat. Off

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. A-12, Cleveland 5, Ohio

Please send copy of "The Case for TOCCO Induction Melting."

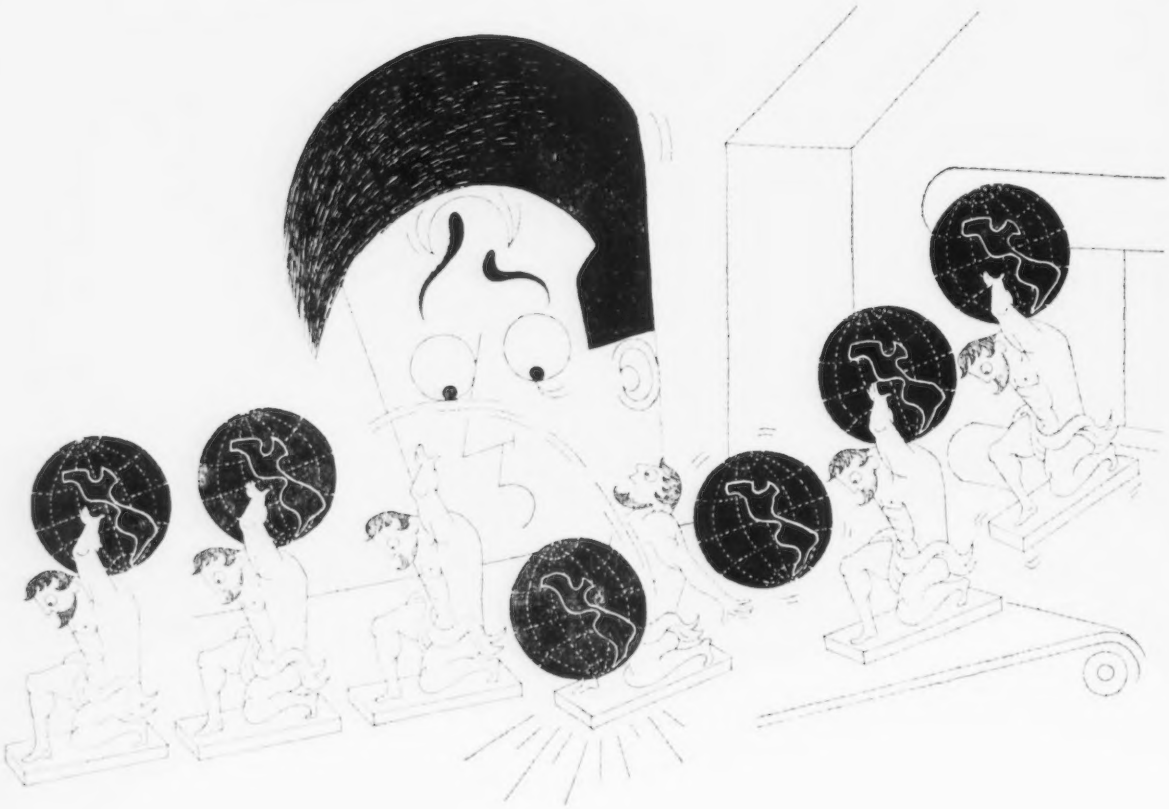
Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____



Got a die casting problem?

You may need dies with the inherent toughness of **NU-DIE V** aluminum die casting die steel—readily available from local Crucible warehouse stocks.

If you make aluminum die casting dies, you need a steel that can successfully withstand high casting temperatures and pressures.

Crucible offers you Nu-Die V Aluminum Die Casting Die Steel—an air-hardening steel with high core strength. This grade offers exceptional resistance to washing and increased resistance to heat checking. It's made to die steel quality and ultra-sonically inspected. Try it. You'll find that Nu-Die V is just what you need for aluminum die casting dies and inserts . . . and that it's economical for long-run zinc dies and inserts, too.

Nu-Die V is stocked in press forged blocks at local Crucible warehouses—along with dozens of other special-purpose steels in the shapes and sizes you need. Remember: Crucible is the only specialty steel producer *fully integrated to the point of use.* That means control and responsibility from raw material to warehouse delivery to you.

STOCKS MAINTAINED OF:

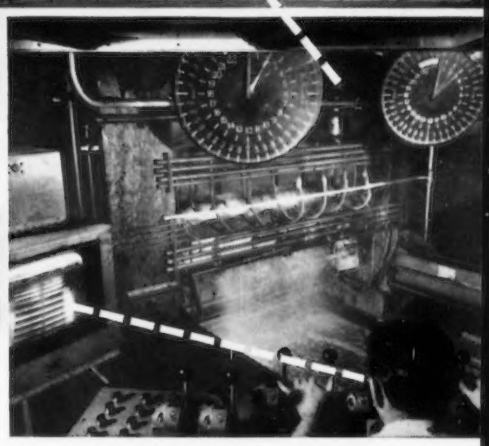
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, Hy-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

CRUCIBLE WAREHOUSE SERVICE

Crucible Steel Company of America

General Sales Offices, The Oliver Building, Mellon Square, Pittsburgh 22, Pa. Branch Offices and Warehouses: Atlanta • Baltimore Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Dayton • Denver • Detroit • Grand Rapids Harrison • Houston • Indianapolis • Los Angeles • Milwaukee • New Haven • New York • Philadelphia • Pittsburgh • Portland, Ore. Providence • Rockford • San Francisco • Seattle • Springfield, Mass. • St. Louis • St. Paul • Syracuse • Toronto, Ont.

This combination hot and cold mill for plate, sheet and tapered sheet at Reynolds Metals' McCook plant, near Chicago, Ill., was designed and built by Loewy-Hydropress.



Control Station features TV observation.

AT REYNOLDS METALS . . .

Country's largest combination breakdown and plate rolling mill produces finished aluminum plate down to .032 in. thickness

Designed and built by Loewy-Hydropress, this Navy rolling mill—largest installation of its kind in America—permits, in addition to the rolling of thick plate, the hot and cold rolling of aluminum alloy tapered plate and sheet so vital to supersonic speed aircraft.

Cast or prerolled solid ingots or prerolled clad ingots are fed into the four-high mill, which can produce aluminum plate *up to 135 in. wide*. Automatic electronic controls and cold rolling under tension allow sheet and plate to be rolled to precision tapered thicknesses down to .032 in. (cold), with a maximum taper of .25 in. per ft. and a maximum length of 480 in. For hot taper rolling, this length can be considerably increased. Here is evidence of Loewy's creativity in rolling mill engineering.

To individual production requirements, Loewy-Hydropress designs, builds and installs hot and cold rolling mills for ferrous and nonferrous metals; continuous merchant and wire-rod mills; skelp mills; two-high and three-high blooming mills; high speed foil mills; continuous billet and sheet-bar mills; strip, slabbing, plate, structural, rail mills; and special mills. For further information, write us today, Dept. A-12.

Loewy-Hydropress Division

BALDWIN · LIMA · HAMILTON

111 FIFTH AVENUE, NEW YORK 3, N.Y. Rolling mills • Hydraulic machinery • Industrial engineering

BALDWIN BLH LIMA-HAMILTON

WHAT'S HAPPENING AT

Horizontal scanning with this Westinghouse induction hardening unit is particularly advantageous because the spray quench falls away from axle. Final quenched temperature of the part is controlled to yield a modified draw and to prevent cracking of deep splines and abrupt shoulders of the axle.

PRODUCT AND **PROFIT** IMPROVEMENT

OLIVER CORPORATION?

They are Saving More Than $1.00 per Axle ... with Westinghouse Induction Heating!

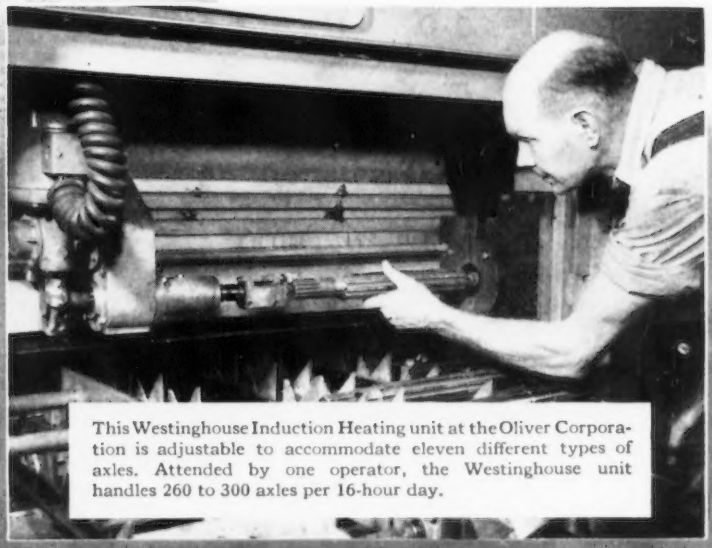
Here's really important news to everyone in metalworking. At Oliver Corporation, Charles City, Iowa, plain carbon steel is automatically heat treated to meet strength specifications . . . one operator takes care of automatic scanning, rapid heating, controlled quench . . . and the Westinghouse Induction Heating units are adjustable to accommodate eleven types of axles. In addition to savings of more than $1.00 per axle because the Westinghouse units made possible the change from an expensive alloy steel to plain carbon, Oliver Corporation cites many other advantages.

They say that with Westinghouse Induction Heating there is less distortion, therefore faster operation . . . 100% better control of case depth and many savings from the standpoints of operating and manufacturing. According to the Oliver Corporation, the Westinghouse Induction Heating units have "revolutionized our methods of heating."

PUT YOUR HEATING ON A PUSHBUTTON PRODUCTION LINE BASIS

For hundreds of plants, Westinghouse engineering has produced integrated induction heating equipment which is successfully handling highly specialized metallurgical and production requirements. Westinghouse Induction Heating can put the *exact* heat you want *exactly* where you want it—day after day, week after week, without variation.

YOU CAN BE SURE... IF IT'S Westinghouse



This Westinghouse Induction Heating unit at the Oliver Corporation is adjustable to accommodate eleven different types of axles. Attended by one operator, the Westinghouse unit handles 260 to 300 axles per 16-hour day.

WITH WESTINGHOUSE INDUCTION HEATING

BUT MAYBE INDUCTION HEATING IS NOT FOR YOU... LET'S FIND OUT

Telephone collect EDmonson 6-2300, or return this coupon to SALES MANAGER, Industrial Electronics Dept., Westinghouse Electric Corporation, P. O. Box 416, Baltimore 3, Maryland.

I believe that we qualify for Westinghouse Induction Heating. _____Please have your engineer call. _____Please send literature. We make _____ (item) from _____ (metal or alloy). Each piece is approx. _____ (size) and weighs approx. _____. We work in temperature range of _____ and handle approx. _____ per hour. We are interested in: _____ Forging _____ Hardening _____ Joining _____ Other.

Please describe briefly _____

Please check below the Westinghouse Induction Heating advantages you believe are superior to your present process.

_____ Selective heat
_____ Instantaneous heat
_____ Minimum scale
_____ Safety
_____ Consistent results
_____ Production-line heating

Name _____ Title _____

Company _____

Street & No. _____

City & State _____

J-35002

ALLIS-CHALMERS . .

Products for steel: motors, m-g sets, rectifiers, control, pumps, *Texrope* drive equipment, crushers, grinding mills, screens, transformers, unit substations, switchgear, circuit breakers, turbine-generators, voltage regulators, blowers, compressors, condensers, and water conditioning equipment.

ALLIS-

in Step with STEEL

The blooming mill

Maximum electrical efficiency is assured in blooming mill operations where Allis-Chalmers equipment is used. From switchgear to drive motors, Allis-Chalmers offers a tailored system — engineered by mill experts and designed to keep high quality blooms rolling fast and accurately.

From mine to final processing—Allis-Chalmers equipment is in step with the increasing tempo of expanding steel production. Contact the nearest A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

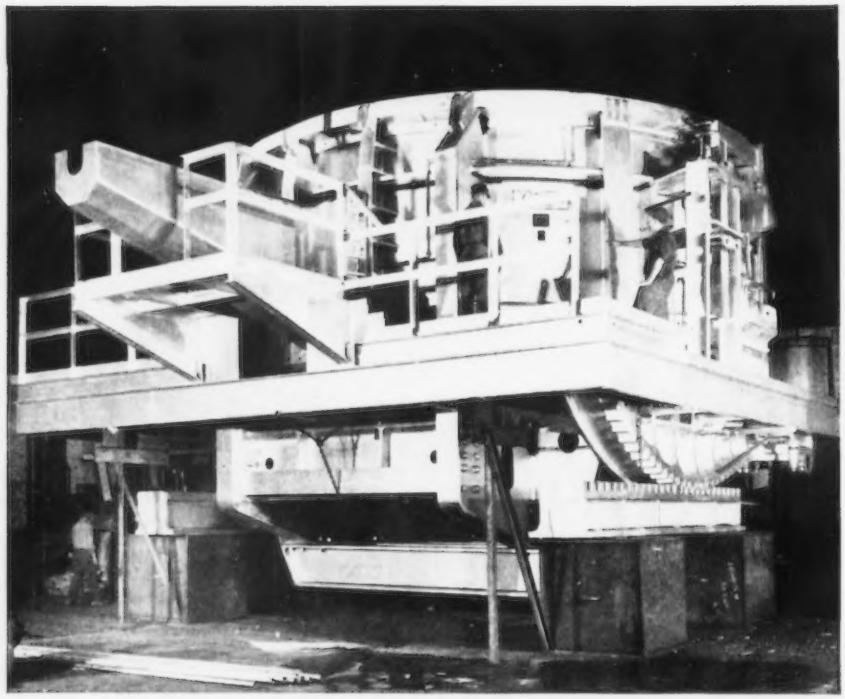
Blooming mill motor room view shows components of the Allis-Chalmers electrical package. Switchgear, control, constant and variable voltage motor-generator sets, *Regulex* motor-generator sets, liquid rheostat, and twin drive motors are designed to work together for peak mill output.

Regulex and *Texrope* are Allis-Chalmers trademarks.

CHALMERS

A-C ALLIS-CHALMERS

A-5411



"I prefer Lectromelt Furnaces because...

Lectromelt* has offset rocker centers which return the furnace from the extreme tilting position, in case of tilting equipment failure. Added safety!

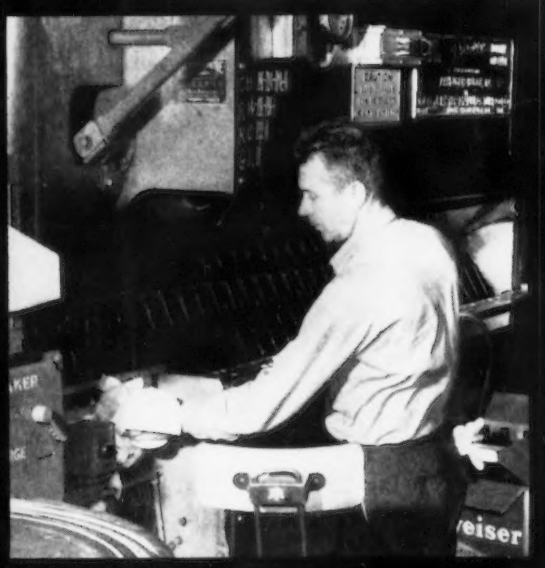
Rockers and tilting mechanism are out-from-under; won't get clogged by spillage or burn-throughs. Like all Lectromelt components, they're sturdy and strong.

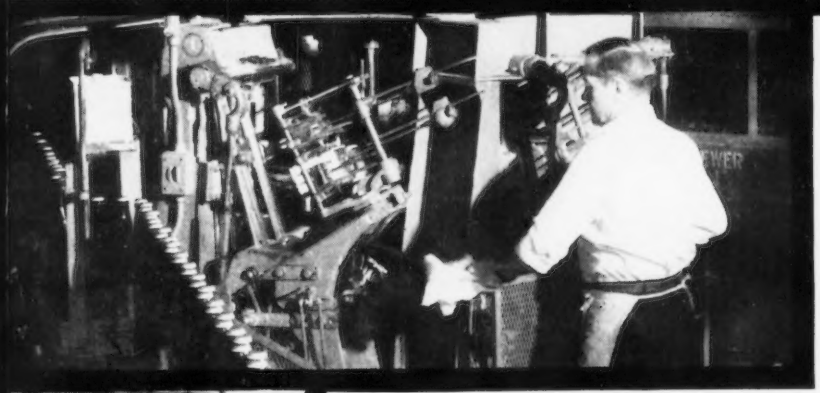
Catalog 9-B describes Lectromelt Furnaces. For a copy, write Lectromelt Furnace Division, McGraw-Edison Company, 312 32nd Street, Pittsburgh 30, Pennsylvania.

Lectromelt*

*Reg. Trademark U. S. Pat. Off.

People buy Scott Wipers for many reasons:





Mr. R. G. Mathi, of the Process Control Department, Anheuser-Busch, says: "We use Scott Wipers for keeping transfer tables clean, wiping excess glue at our label machines, wiping safety glass partitions, preventing moisture accumulation on machines and other equipment, cleaning dismantled equipment and parts, and of course for personal use—because they're absolutely sanitary."

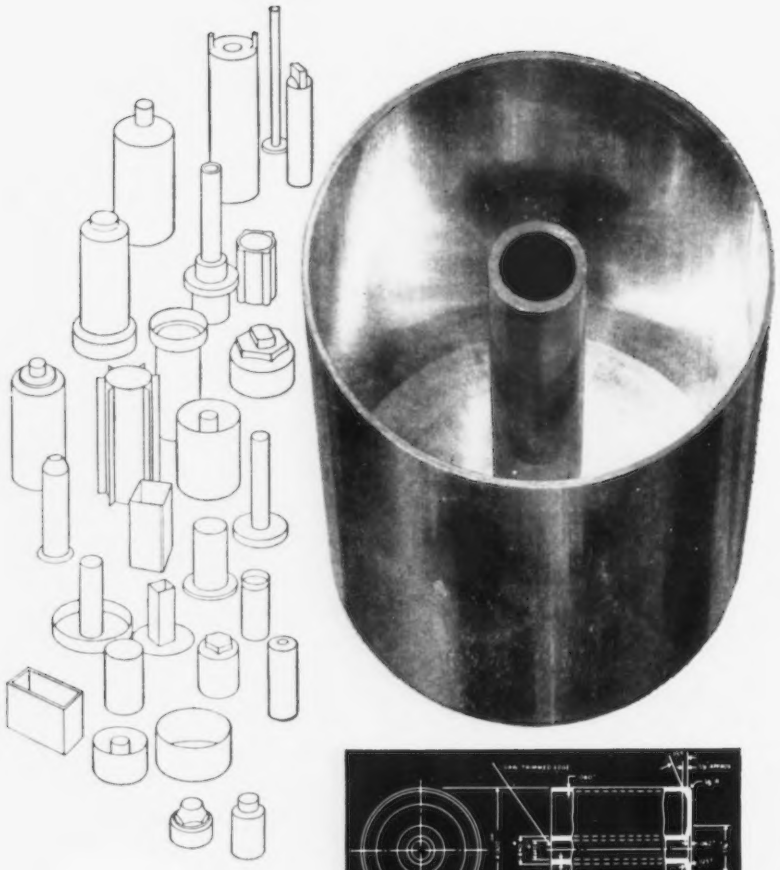
ANHEUSER-BUSCH says: "Scott Wipers help us maintain a clean, sanitary plant!"

Famous Budweiser, Busch Bavarian and Michelob Beers are bottled, canned, barrelled and packaged under the most rigid standards of quality control. Early in 1956, Anheuser-Busch, Inc., St. Louis, put in Scott Wipers as a "housekeeping aid," with great success. Disposable 2-ply paper Scott Wipers are soft, highly absorbent, lint-free and uniform in size . . . make housekeeping easier. Employees like their quick availability in individual boxes at each work station. Scott Wipers are always fresh and sanitary out of the box! And being disposable, Scott Wipers eliminate special handling.

SCOTT PAPER

For the complete Anheuser-Busch case history—facts and figures—find your local Scott distributor in the Yellow Pages under "Paper Towels" and call him! Or write: Scott Paper Company, Dept. IA-712, Chester, Pa.

Maker of the famous Scott paper products you use in your home. See "Father Knows Best" and "The Gisele MacKenzie Show" on NBC-TV.



made in one piece–in one stroke as an **ALCOA IMPACT**

Faced with the problem of designing this center-tube impact as a one-piece part, a designer who is not familiar with Alcoa® Impacts would throw up his hands. Then he would break out the slide rule to start figuring costs on welding the center tube to the base. After that, he'd have to puzzle out an inexpensive way to join the base to the side wall. The fact is, he never would figure out a way to do it economically.

To the informed designer who *is* familiar with Alcoa Impacts, this would be just another routine job that he could rely on Alcoa's Impacts experts to knock out for him. In spite of its rather complicated design, it is formed (as are all impacts) in a fraction of a second, with a single stroke of the punch. It is a strong, lightweight, seamless part. Actually made better, stronger and more economically than it could have been by *any* other fabricating method.

To guide your thinking, check the handy rules of thumb below. Any part that is a closed-end tubular part, or cup-shaped, should be considered as an Alcoa Impact. In one shot, we can make round, oval, square or special shapes. Ribs, splines, flutes or other functional or decorative patterns can be incorporated on the inside or outside. Let your imagination go to work; we're anxious to go to work for you.

To get your imagination started, send for Alcoa's design manual, *Alcoa Impacts—Metal in Motion*. You'll find it loaded with design tips and ideas that have saved other designers a lot of money. For on-the-spot assistance, call your nearest Alcoa sales office. It's listed under "Aluminum" in the Yellow Pages of your telephone directory. An Alcoa sales engineer will put his solid technical know-how at your disposal. Aluminum Company of America, 1997-M Alcoa Building, Pittsburgh 19, Pa.

Some Impact Rules of Thumb—
Check your problems against this list:

1. Parts requiring hollow sections—either tube or cup-shaped with one end closed.
2. Parts with walls or surfaces requiring zero draft.
3. Parts requiring lengths up to eight or ten times the diameter.
4. Parts requiring the strength of forgings.
5. Parts requiring tolerances down to ±0.005".
6. Parts requiring ribs, bosses or fins as integral parts.
7. Parts requiring low unit cost in mass production. (Often the savings in machining, fabrication and assembly made by impacts amortize tooling in relatively short runs.)

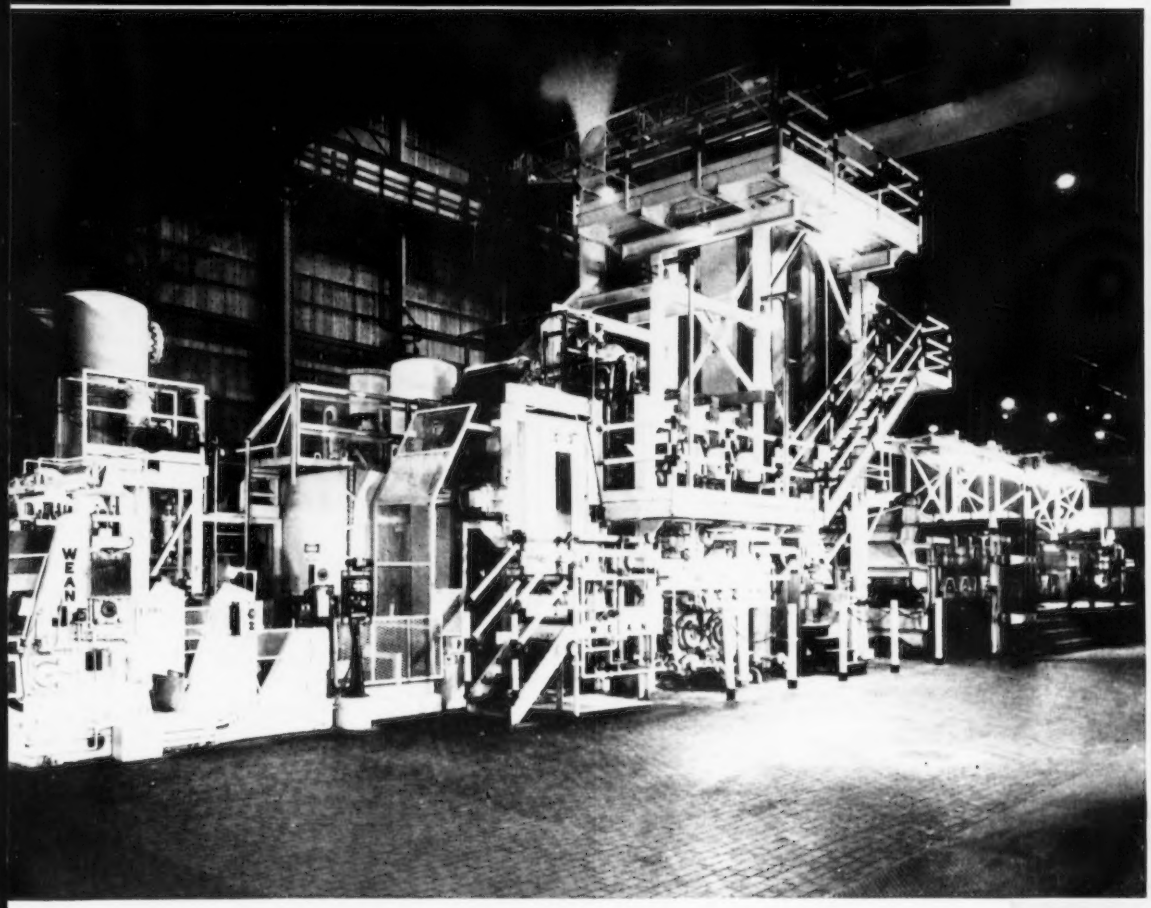
ALCOA ALUMINUM IMPACTS

YOUR GUIDE TO THE BEST IN ALUMINUM VALUE

NEW!
"ALCOA THEATRE"
Exciting Adventure
ALTERNATE MONDAY EVENINGS

Electrolytic tinning lines maintain highest product quality through

WEAN CREATIVE ENGINEERING



VIRTUALLY since the inception of the idea, Wean has played a major role in the successful development and manufacture of equipment for the production of tin plate by the Electrolytic process. Wean-engineered tin plate lines have established outstanding production records, but of equal importance, these same lines have continuously maintained highest product standards to meet industry's ever increasing demand for quality . . . in quantity.

Wean has engineered forty-seven Electrolytic tin lines to date. Why not avail yourself of this vast specialized experience to solve your tin plate production problems?

538

THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO

NEW Starrett SAFE-FLEX® HIGH SPEED STEEL BAND SAW

Cuts up to 10 times faster...with up to 30 times longer life

This is the new Starrett SAFE-FLEX® Band Saw — a *high speed steel* band saw that cuts up to 10 times faster, outlasts ordinary blades as much as 30 to 1. Engineered for higher speeds and heavier feeds to cut harder and tougher materials with ease and safety, it pays for itself over and over in lower cutting costs, longer tool life and substantial material savings.

Red-heat hardness even at temperatures up to 1100° F. keeps this new band hard and sharp. Graduated hardness gives it super-hard teeth and a super-tough back. Thinner section (.025″ to .042″) lets it cut faster with less power and less chip loss.

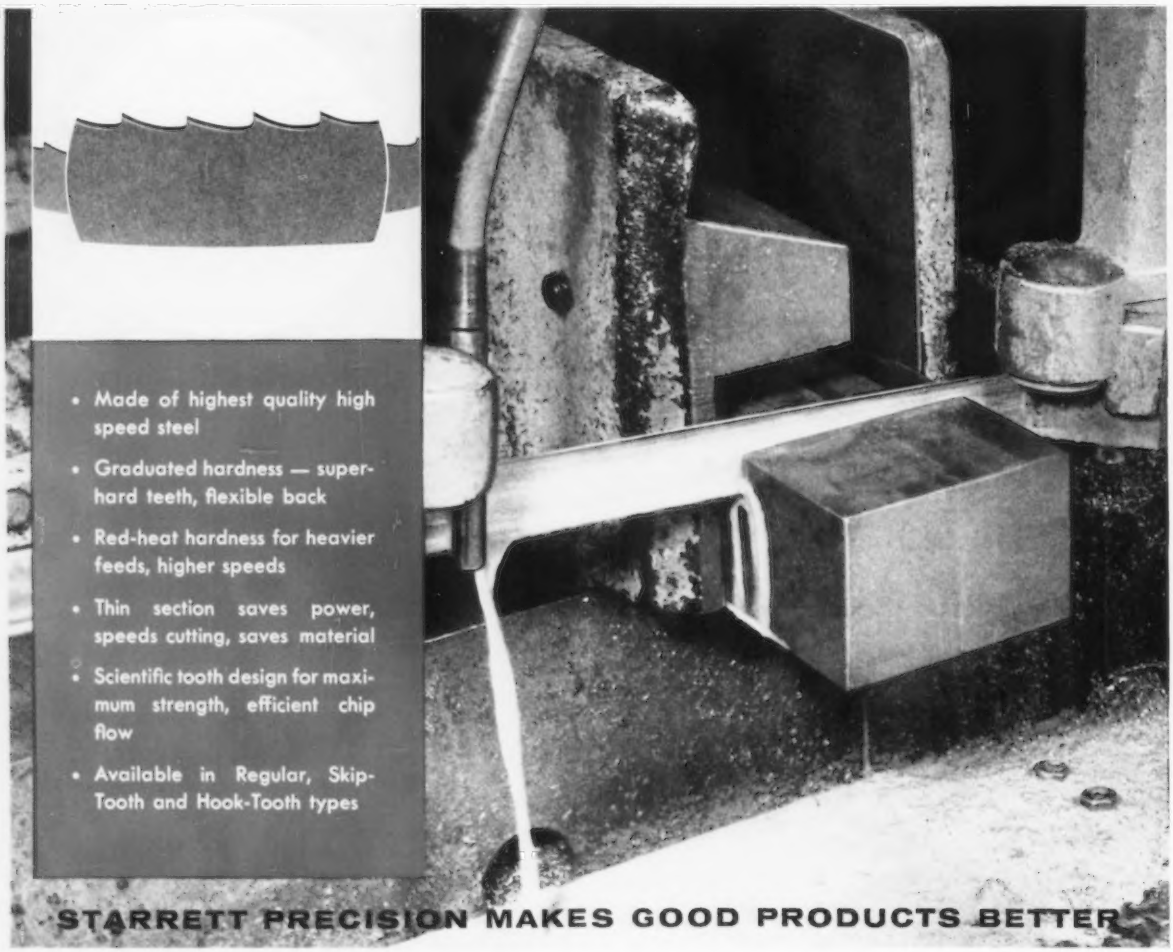
Your nearby Industrial Supply Distributor has this new Starrett SAFE-FLEX® High Speed Steel Band Saw in Regular, Skip-Tooth and Hook-Tooth types. Call him for quality products, dependable service — or write for complete information. Address Dept. IA, The L. S. Starrett Company, Athol, Mass., U. S. A.

Starrett

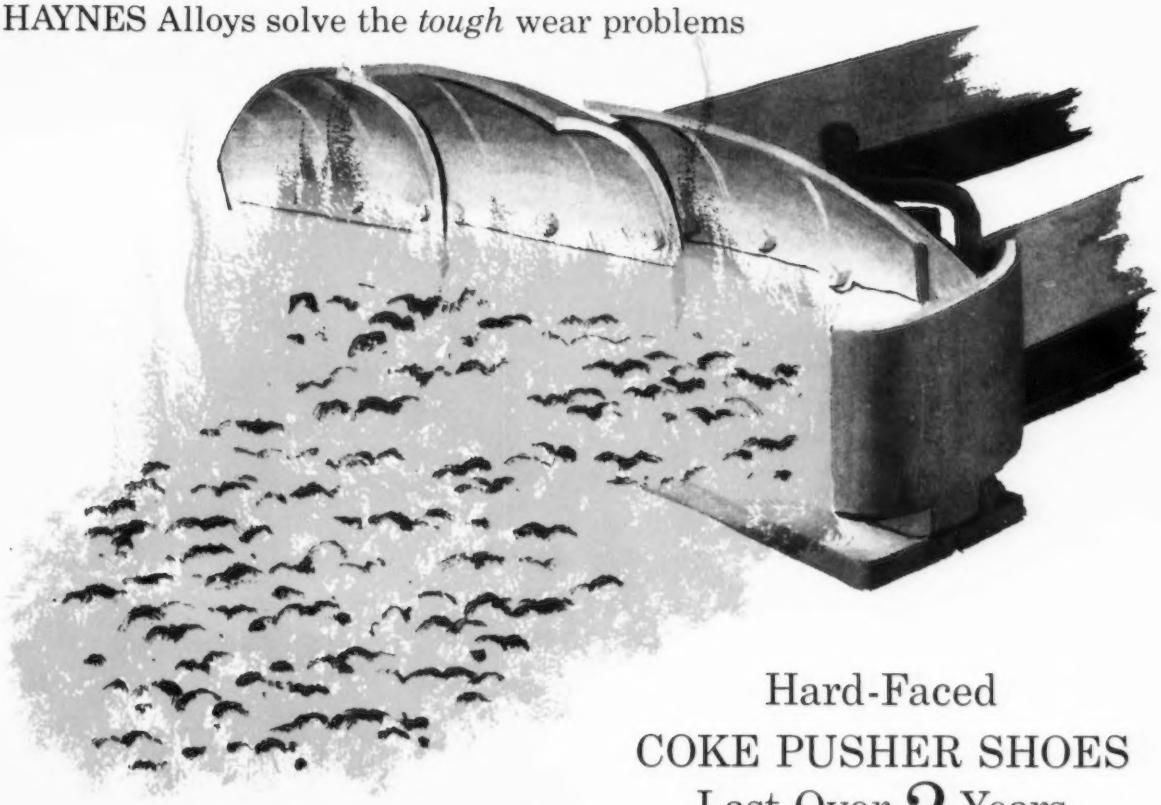
PRODUCTION-PROVED BAND SAWS

World's Greatest Toolmakers

PRECISION TOOLS • DIAL INDICATORS • STEEL TAPES • GROUND FLAT STOCK • HACKSAWS • HOLE SAWS • BAND SAWS • BAND KNIVES



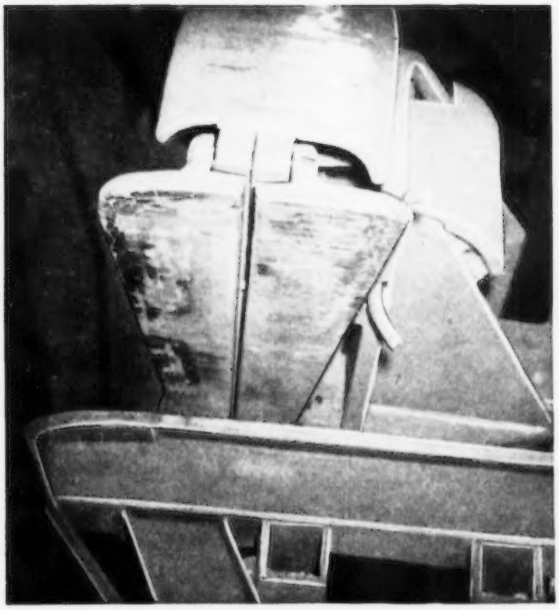
HAYNES Alloys solve the *tough* wear problems



Hard-Faced COKE PUSHER SHOES Last Over 2 Years

Resisting severe abrasion, heat, and thermal shock produced by riding over the coke-covered floor of 1800-deg. F. ovens—these shoes hard-faced with HAYNES STELLITE alloy No. 1 lasted over two years. Ordinary steel shoes wore out in two months.

Whatever your wear or abrasion problem, there is a HAYNES hard-facing alloy especially made to combat it. There are 18 HAYNES hard-facing alloys . . . a wide selection that assures economical protection from the most severe conditions of heat, corrosion, erosion, or wear. For the complete story write for descriptive literature or contact our nearest sales office. HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, General Offices and Works, Kokomo, Indiana.



These shoes, hard-faced with HAYNES STELLITE alloy No. 1, resist abrasion from the coke particles and the lining of the oven floor. The hard-faced deposit does not chip or spall under the thermal shock of returning from 1800 deg. F., in the oven, to ordinary atmospheric temperatures.

HAYNES ALLOYS

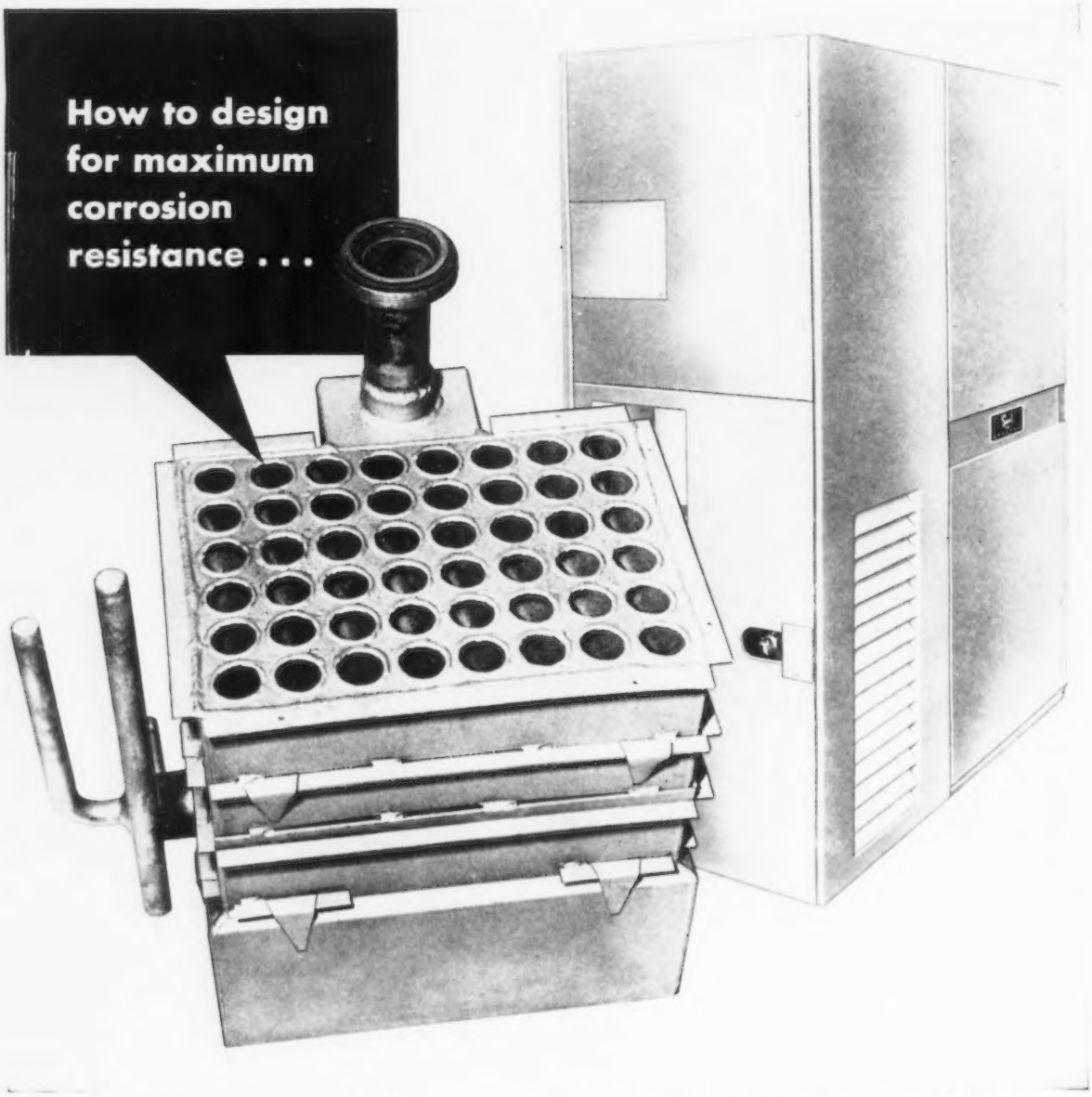
HAYNES STELLITE COMPANY

Division of Union Carbide Corporation

Kokomo, Indiana

UNION CARBIDE

"Haynes," "Haynes Stellite" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.



. . . insist on *Carpenter* Stainless Tubing

Severe corrosion problems were encountered in handling hot flue gas and boiling lithium bromide solution in this generator for a gas-fired year-round air conditioner. The tubes transfer heat from the flue gas to boil a solution of 50% lithium bromide and water surrounding the tubes.

A change to Carpenter Stainless Tubing ended the corrosion problem. Handling this unusual combination of corrodents is just one more example of how Carpenter quality pays off in improved products and lower costs. There's a Carpenter Distributor as near as your telephone. Call him today.

MEMBER

The Carpenter Steel Company
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

WHEELABRATOR® STEEL SHOT

cuts abrasive costs for

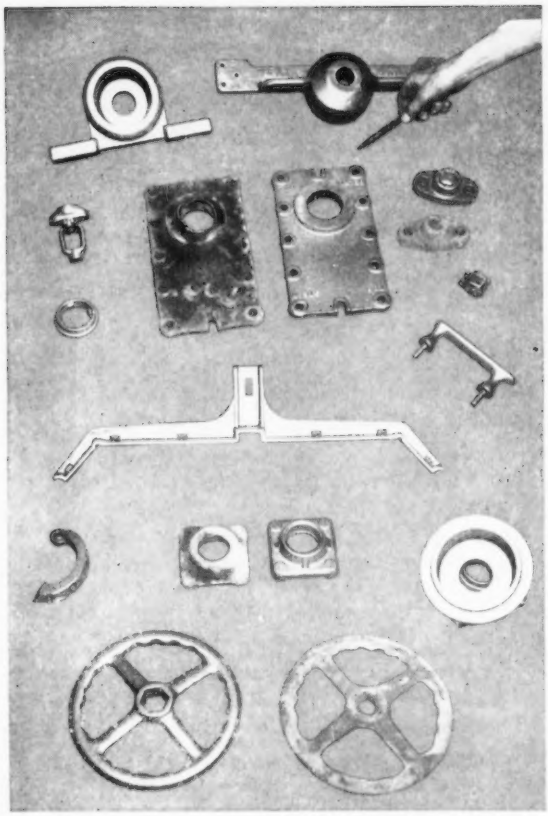
ALL TYPES

of foundries

GRAY IRON FOUNDRY

reduces abrasive consumption

75%



Castings shown here before and after cleaning illustrate the thorough cleaning accomplished with Wheelabrator.

Cleaning an average of 13 tons of gray iron castings a day, the Plainville Castings Co., Westfield, Mass., used to consume 100 lbs. of chilled iron shot every day and 200 lbs. of malleable iron shot every week.

On the basis of a 4-week month this adds up to a total of 2,800 lbs. of abrasive per month. With Wheelabrator Steel Shot, the heat treated electric furnace steel shot, the same amount of cleaning is accomplished with only 400 to 500 lbs. per month.

Besides achieving these outsanding reductions in shot consumption and shot costs, Wheelabrator Steel Shot also provides "a beautiful finish, in comparison to the other abrasives," according to Joe Stopski, Foundry Superintendent. "We also find that our maintenance costs are lowered" the superintendent adds.

Wheelabrator Steel Shot is bringing savings in abrasive consumption, abrasive costs, maintenance expense and parts replacement to all types and sizes of foundries. Why don't you let this versatile shot save for you, too?

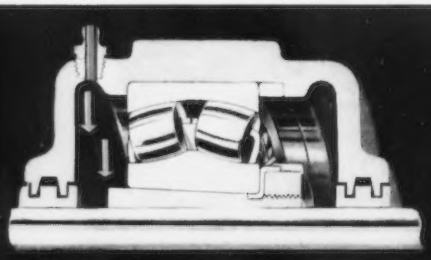
Write today for your free copy of Bulletin 89-B for more information on Wheelabrator Steel Shot.

WHEELABRATOR
CORPORATION

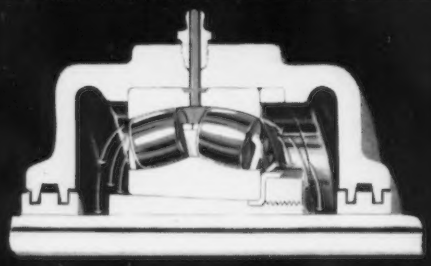
510 South Byrkit Street Mishawaka, Indiana

At No Extra Charge ...A MAJOR IMPROVEMENT

IN LUBRICATING SPHERICAL ROLLER BEARINGS



Originally, lubricant entered the bearing housing via a fitting in the side of the housing cap. Flow path was through the bearing.



NOW, the lubricant is introduced through a fitting in the center of the housing cap and moves along a groove that is machined around the circumference of the outer ring. Equally spaced holes drilled in the ring permit the lubricant to enter the center of the bearing.

Nobody but SKF Offers This to You on Spherical Roller Bearings

Once again **SKF** offers another important innovation in spherical roller bearing design. Available in spherical roller bearings 140 mm (5.5118") O.D. and larger, this feature represents a still further improvement to the proven **SKF** Type "C" Spherical Roller Bearing.

The new design allows the lubricant to enter at the *center* of the bearing and move outwardly – completely covering all working surfaces. Old lubricant is flushed away from the bearing and, with it, any abrasive dust, dirt, moisture, or other impurities.

You can use this improved bearing in your existing housings simply by moving the lubrication fitting to the center.

Here again is an example of how **SKF** helps you to obtain longer bearing life, at no added cost. Send for Bulletin No. 443 for complete details. 7781

EVERY TYPE—EVERY USE

Ball Bearings
Cylindrical Roller Bearings
Spherical Roller Bearings
Tapered Roller Bearings ("Tyson")

*Reg. U. S. Pat. Off.

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

2500 pound ingot of titanium cast in a single mold using ti sponge as the consumable electrode.

NOW melt buttons, pounds, or tons in proved vacuum arc furnaces

W. C. Heraeus of Hanau, Germany, have made and operated more than 100 of these vacuum arc furnaces over a ten-year span.

Now you can share the mastery of vacuum melting and casting gained through this broad experience. The furnaces are for sale on a royalty-free basis. Included are complete information and thorough training in proved techniques—all with no strings attached.

You can now produce melts in vacuum or a controlled atmosphere—in ingots up to 24" diameter and larger—of steel, zirconium, titanium, and high melting point alloys. You can produce melts of very high purity and superior grain structure; for example: titanium with hydrogen levels held to 0.0012 wt.% and Brinell hardness values between 95 and 105.

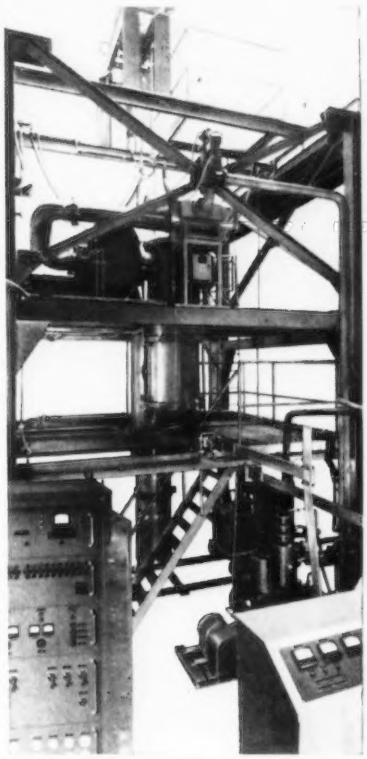
Unique electrode feed. The high quality of the melts is attained by feeding the consumable* electrodes at optimum rates. An electronic system, the Heratron Control, monitors arc voltage, current, and short circuits—and automatically maintains the arc between $\frac{1}{2}$ and 1 inch in length.

Maintaining the vacuum. Each pumping system is assembled from the world's largest selection of CEC vapor pumps, Roots pumps, and other mechanical pumps. Whether your specifications call for a diffusion-ejector pump plus a Roots pump or a Roots pump plus another mechanical pump, CEC can provide the very finest together with the necessary vacuum controls, gauges, valves, and piping.

How to purchase. There are five standard models of the Heraeus furnace with capacities from 20 lbs. to 6600 lbs. of steel—and special designs with capacities ranging up to and beyond 10,000 lbs. of steel.

CEC has an exclusive license to sell and service these furnaces, the Roots pumps, and accessories. For a complete discussion of these proved furnaces, write for Bulletin 4-27.

*The smallest of these furnaces also operate with nonconsumable electrodes



Ingots of 16" diameter can be processed in this Model VA-L 600 sh Heraeus furnace.

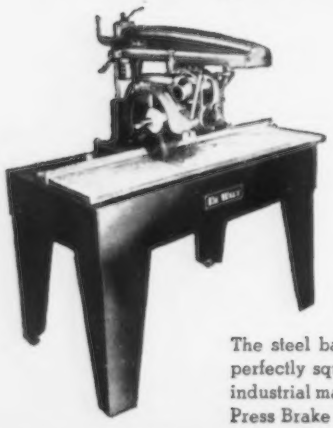
Consolidated Electrodynamics

Rochester Division, Rochester 3, N. Y.

formerly Consolidated Vacuum

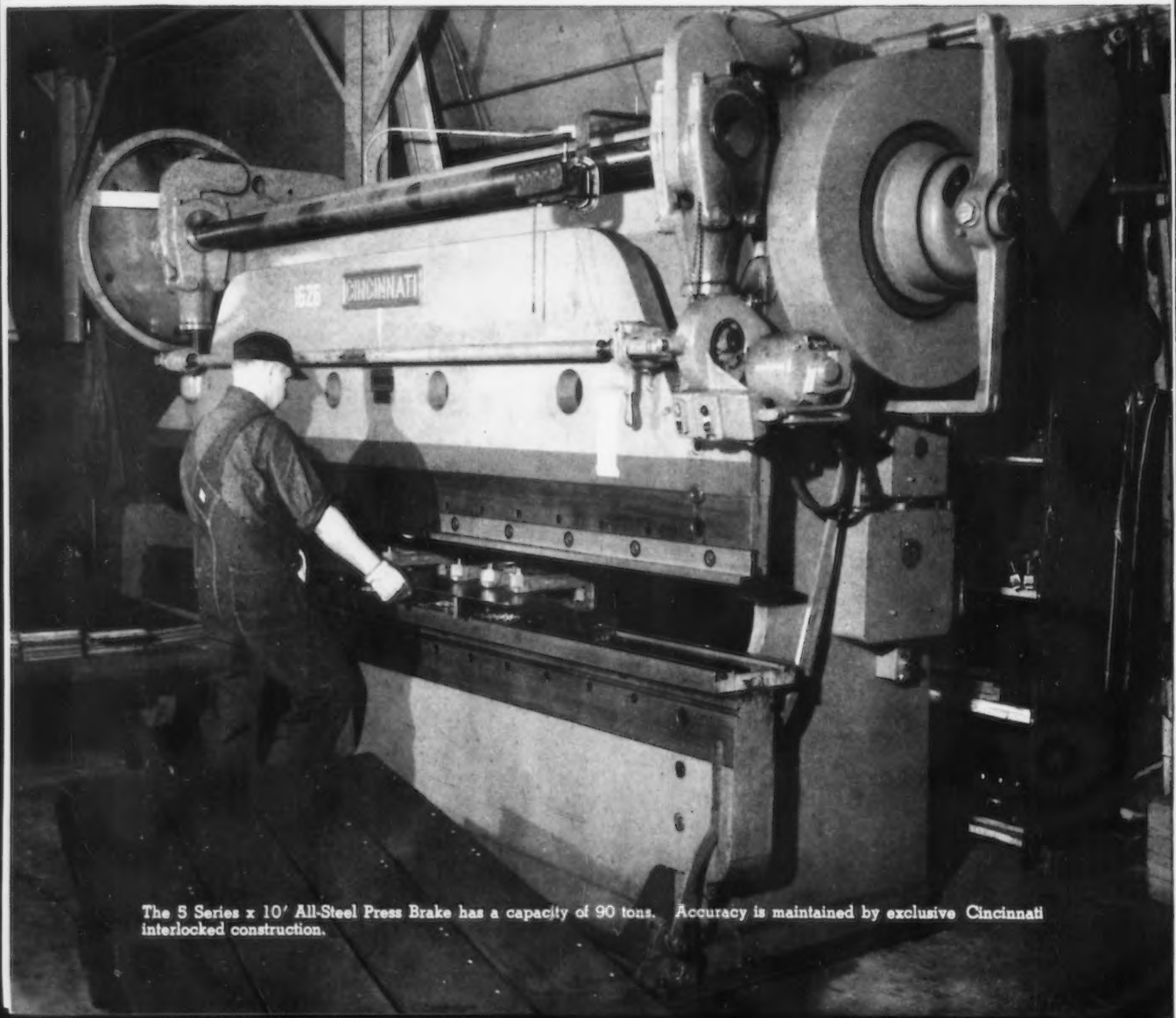
SALES AND SERVICE OFFICES IN PRINCIPAL CITIES

1/3 cost reduction combined with product improvement...by use of Cincinnati Shear and Press Brake

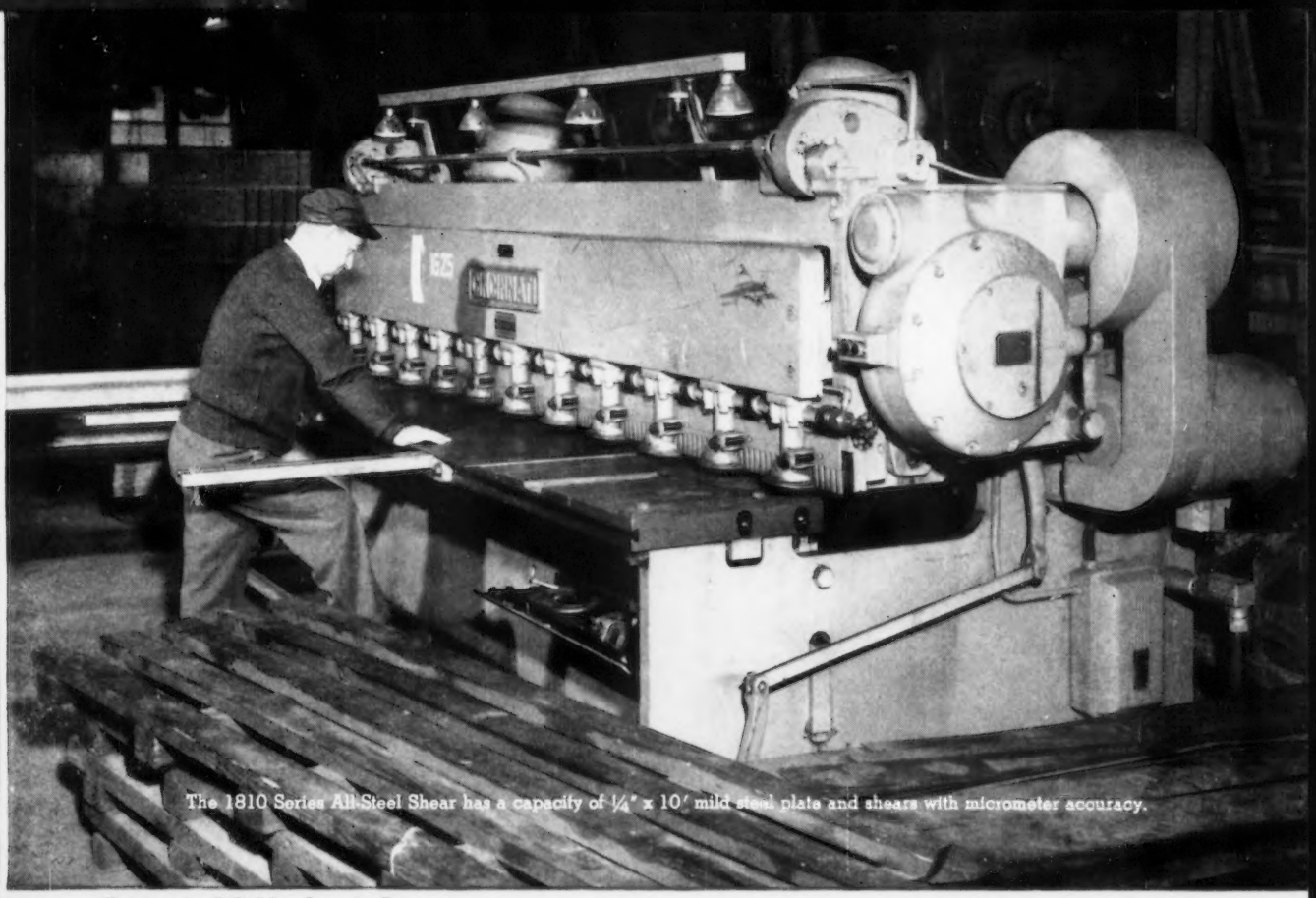


. . . at **DE WALT INC.** Lancaster, Penn.

The steel bases of all DeWalt woodworking machinery must be perfectly square, flat and true. Both home shop and heavy duty industrial machines are produced on the Cincinnati Shear and Press Brake shown.



The 5 Series x 10′ All-Steel Press Brake has a capacity of 90 tons. Accuracy is maintained by exclusive Cincinnati interlocked construction.



The 1810 Series All-Steel Shear has a capacity of ¼" x 10' mild steel plate and shears with micrometer accuracy.

Photos courtesy DeWalt Inc., Lancaster, Pa.

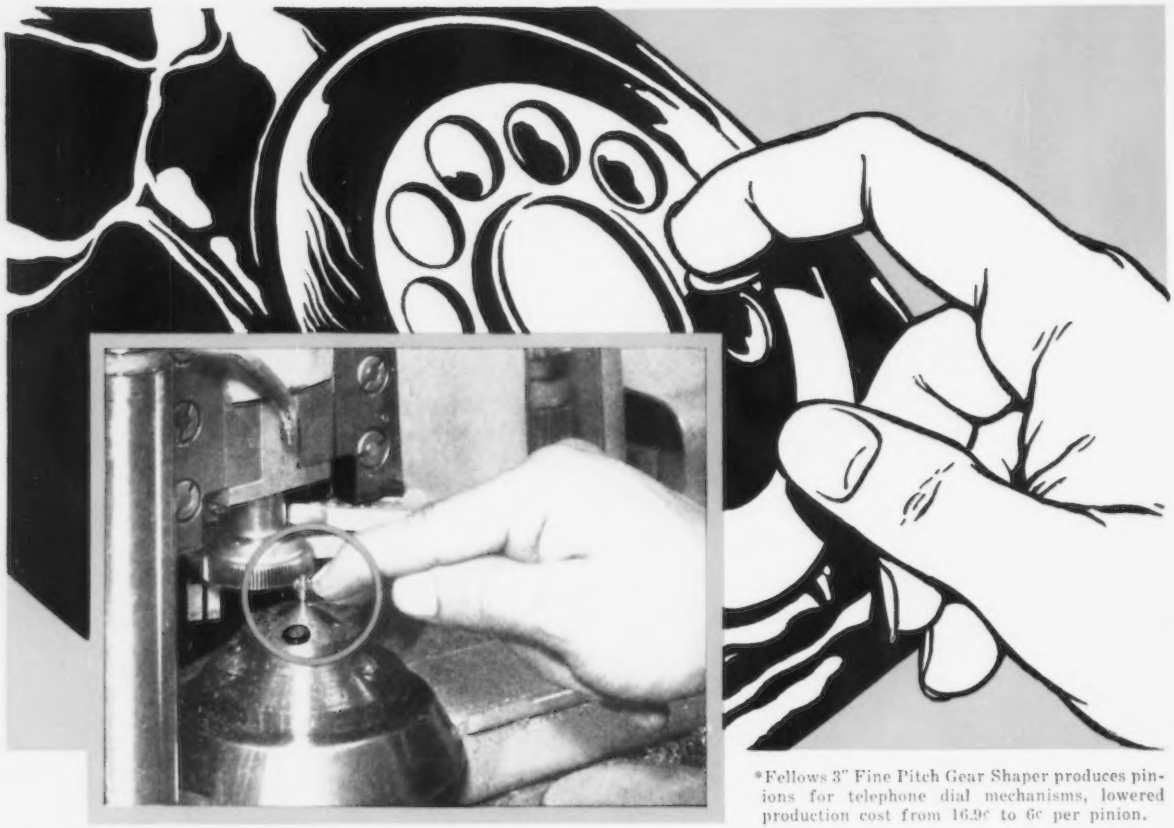
This performance story from DeWalt Inc. tells of improved quality and reduced costs. We quote: "Before purchasing the Cincinnati Shear and Press Brake, we bought formed channels and arc welded them together at the seams. We now buy sheet steel stock—then cut, punch, form, and spot weld the steel bases in our own plant. We have ***reduced costs on this operation by over 1/3*** on the first run employing these methods, and expect costs to diminish still more as operator familiarity and efficiency increase. In addition to the cost factor, it was previously difficult to maintain precision flatness in the tables. Using the new methods and the Cincinnati machines, we now have no difficulty."

Note the improved design of the Model MB "Power Shop" machine shown at right above. The new, improved cabinet is now produced on the Cincinnati Shear and Press Brake at an ***overall cost reduction of 15%***. Previously the cabinet at left was a purchased item.

Write Department B for Catalog B-5 and Catalog S-7R and consult our Application Engineering Department about your production problems.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS · SHEARS · PRESS BRAKES



*Fellows 3" Fine Pitch Gear Shaper produces pinions for telephone dial mechanisms, lowered production cost from 16.9¢ to 6¢ per pinion.

GEARED to put the world at your finger tips!

A movement of your finger brings the whole country within reach of your telephone... thanks to the automatic dial system! For only dependable dial switching can handle tens of millions of calls daily, leave operators free for long distance and other non-routine services.

Tiny gears produced on Fellows Gear Shapers are important to the smooth, dependable service of many of America's dial phones, providing trouble-free performance year after year, decade after decade. These pinions must be of high quality, yet production cost must be low. For telephones, as for many other products, the requirements for accuracy and low cost in gears are met by Fellows Gear Production Equipment.*

Your own gear production needs, from 1 16" to 120" pitch diameter, can probably be met more profitably and efficiently with Fellows equipment. Why not get full information? Just write, wire or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N.J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

THE PRECISION LINE

Fellows *Gear Production Equipment*

CALL CRUCIBLE FOR CONSISTENTLY UNIFORM STAINLESS STRIP

From coil to coil and heat to heat, you can rely on the uniformity of Crucible Stainless steel strip—in flatness, in finish, and in metallurgical quality. And Crucible's full integration from raw material to final delivery is your assurance of prompt, dependable service as well. For these two reasons, it pays to call Crucible whenever you need stainless strip. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Canadian Distributor — Railway & Power Engineering Corp., Ltd.

A TREMENDOUS SUCCESS

because they combine Safety with Wearer Appeal!

AO 2-TONE ULTRASCOPIC SAFETY SPECTACLES

Plant eye protection programs *really work* when glasses like these guard workers' eyes! That's why safety directors everywhere have acclaimed the new AO F9700 2-TONE ULTRASCOPIC and backed their enthusiasm for these safety glasses with a deluge of orders!

1. They know that they are buying a true safety frame as well as true safety lenses with *every* pair. A frame that will hold lenses and eyewire with a vise-like grip if hit severely. (Non-safety frames cannot provide this protection.)

2. They know that they are buying safety glasses with an eye-appeal that makes men and women workers exclaim "That's for me!"

You can see that the AO F9700 2-Tone Ultrascopic is *handsome* eye protection. You can also see that it is *safe* eye protection by the Ⓐ plaque on the frame front which indicates a true safety frame. That's why we say give your workers the SAFEST, the SMARTEST, the FINEST!

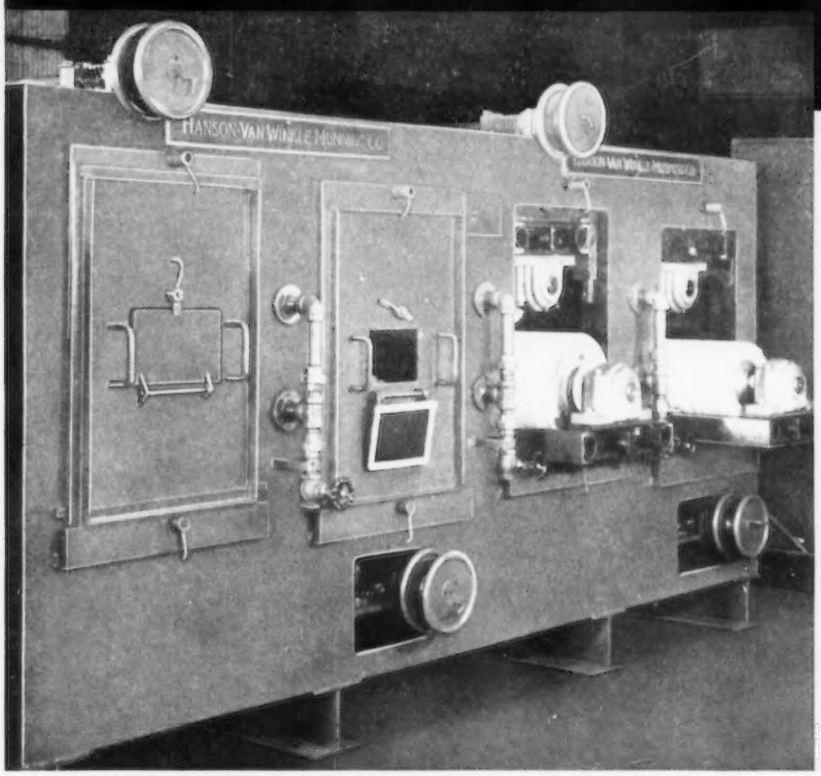
- 2-tone onyx on clear crystal plastic frame
- matching spatula temples
- 6 Curve Super Armorplate clear, medium Calobar, dark Calobar and extra dark Calobar lenses. Also available with clear Plastolite lenses.

American Ⓐ Optical
COMPANY
SAFETY PRODUCTS DIVISION

Always insist on the Ⓐ Trademark on lenses and frames.

SOUTHBRIDGE, MASSACHUSETTS
Branches in Principal Cities

CONTINUOUS STRIP AND SHEET METAL PROCESSORS



cut cleaning time to a fraction with this automatic H-VW-M SCRUBBER UNIT

H-VW-M Scrubber Unit. Brush units are pulled out for inspection. In a matter of minutes they could be replaced, if necessary with new brushes.

...and no down time either! Brushes are replaced easily while unit is in operation!

H-VW-M Scrubber Units—which adapt to fit into any system—are equipped with an exclusive, patented device that permits replacement of brushes *while the unit is running.* Just turn a few bolts, slide worn brush out, and insert replacement. Not a moment's production time is lost!

Add the advantages of this remarkable new feature to the enormous savings you'll realize in cleaning, reworking and inspection time, and you'll see why the rugged, efficient H-VW-M Scrubber Unit has no equal. 3149

Get more facts about H-VW-M Scrubbers, with their exclusive easy-brush-replacement feature, by writing today.

Hanson-Van Winkle-Munning Co., Matawan, New Jersey. Offices in principal cities.

H-VW-M

PLATEMANSHIP —Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

Hanson-Van Winkle-Munning Company, Matawan, New Jersey. Offices in principal cities.

How to reduce costs 75%

What makes an HA PAYLOADER® best for your job?

- Shortest turning radius
- Higher dumping height
- Biggest Bucket (18 cu. ft. payload)
- Hydraulic load-shock-absorber
- 40° bucket tip-back at ground level
- Exclusive one-lever bucket control

THE FRANK G. HOUGH CO.
733 Sunnyside Avenue • Libertyville, Illinois

Please send "PAYLOADER" information

- [ ] Model HA (2,000 lbs. carry cap.)
- [ ] Model HAH (3,000 lbs. carry cap.)
- [ ] Attachments for scrap handling

Name
Title
Company
Street
City
State
12-A-3

It was only a year ago that Ravena Iron Company Mfgs., Ravena, N. Y. joined the hundreds of foundries that are "PAYLOADER" tractor-shovel users. And like the others, their model HA "PAYLOADER" has already paid a handsome dividend in time and labor savings and in reduced costs. On one clean-up job alone at Ravena it easily does in 2 hours what formerly was a hard 8-hour chore for two men — a reduction of 75% in handling costs. And so it goes on the rest of their sand-handling and general maintenance operations since they mechanized with a "PAYLOADER" at this gray iron foundry.

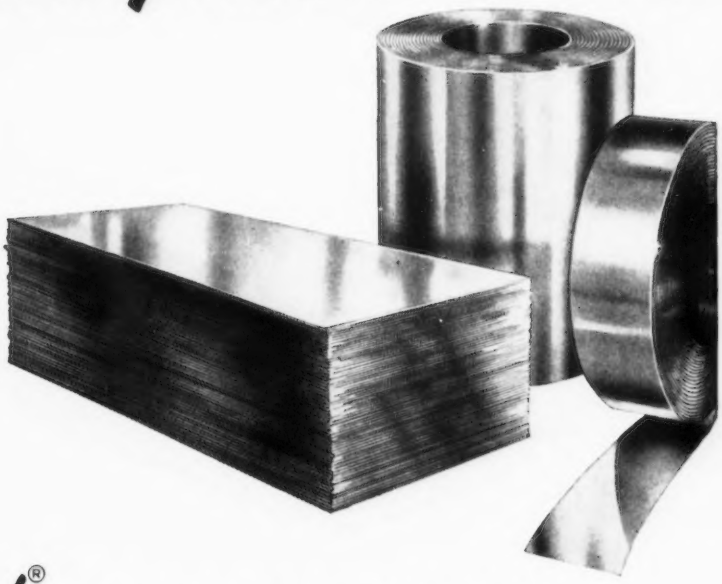
Foundries of all kinds — big and little — gray iron, steel, malleable and non-ferrous have been joining the ranks of "PAYLOADER" users and boosters for 12 years. And today's model HA "PAYLOADER" is a vast improvement over yesterday's — in productive capacity, digging ability, carrying capacity, carrying speed, in operator ease and safety and in lower maintenance.

Whether your foundry has an old style "PAYLOADER" or *none*, you should have your Hough Distributor demonstrate what a *modern* "PAYLOADER" can do for you. The Frank G. Hough Co., 733 Sunnyside Avenue, Libertyville, Illinois.

SAY "HUFF"

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY INTERNATIONAL HARVESTER COMPANY

Wherever you are you get *quick personal service*



when you order *MicroRold*® Stainless Steel Sheet & Strip

SPECIFICATIONS

	WIDTH	THICKNESS
SHEETS	up to 36″	.005 to .109
	up to 48″	.010 to .109
STRIP	up to 23 15/16″	.0015 to .090
GRADES:	201, 202, 301, 302, 304, 305, 316, 321, 347, 403, 410, 430 and Micro-Mach (special extra-high-tensile aircraft grade)	

Any one of the 305 independent steel warehouse distributors stocking MicroRold Stainless Steel is ready to serve as your *personal* stainless procurement representative. Located strategically in the U. S. A., Canada and Europe, your MicroRold distributor carries a variety of grades, widths, thicknesses and finishes and is fully qualified to assist you in the selection and fabrication of the most suitable stainless grade for your particular requirements.

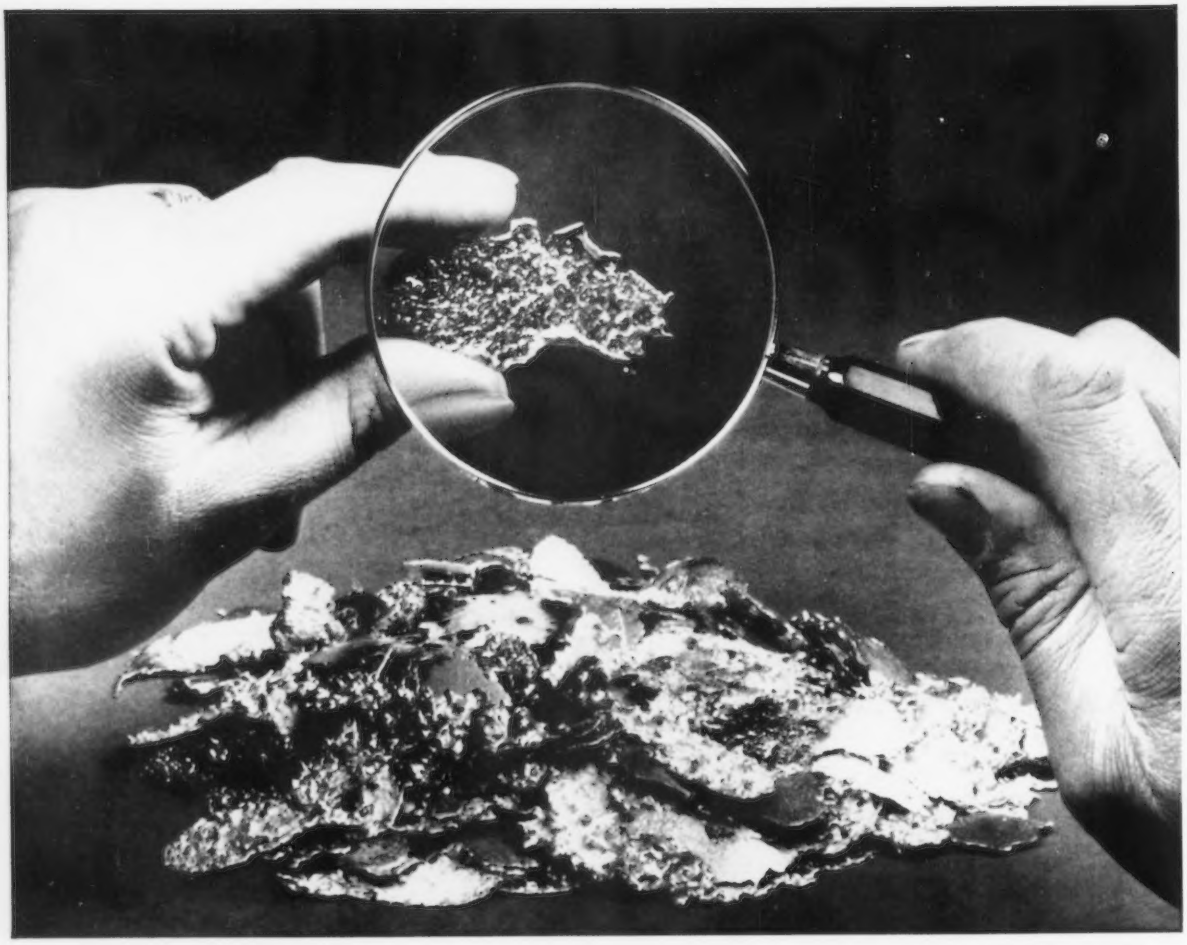
Your MicroRold stainless steel distributor assures you of the fastest possible deliveries with an absolute minimum of red tape in order processing. If he is unable to fulfill your needs from stock he has available direct and immediate service from our mill. In cases of emergency, it is possible for us to roll and ship MicroRold Stainless Steel the same day the order is received.

You can rely on MicroRold service as a dependable source of supply, either mill or distributor delivery.

Write, wire or phone today for the name of your nearest MicroRold Stainless Steel Distributor.

WASHINGTON STEEL CORPORATION

12-L WOODLAND AVENUE WASHINGTON, PENNSYLVANIA



NEW U. S. I. ZIRCONIUM PLATELETS ELIMINATE SAFETY PROBLEM

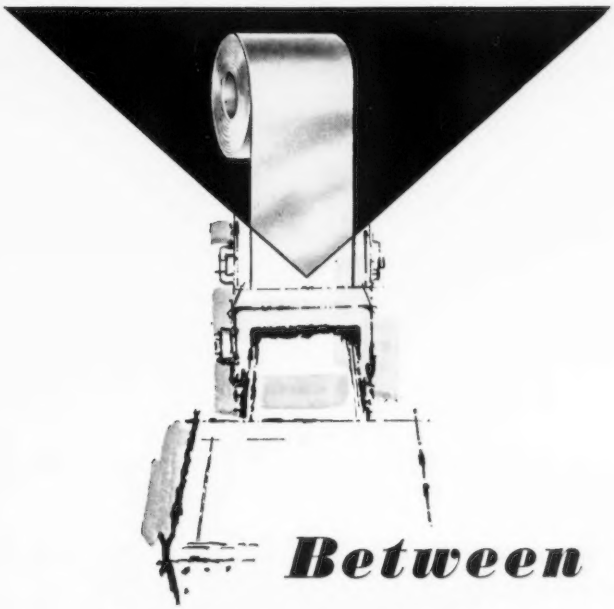
You're looking at a new form of zirconium —the non-pyrophoric, non-hygroscopic platelets produced by U.S.I.'s new plant at Ashtabula, Ohio. Zirconium platelets eliminate the handling hazards of the more familiar sponge metal because of their low ratio of surface to weight. Special shipping precautions are not required. Platelets also make possible a safer, cleaner melting operation.

Production of U.S.I. zirconium employs a new, semi-continuous sodium reduction process, yielding top-quality metal almost completely free of sodium, magnesium, chlorides, hydrogen and moisture. Prices are coming down too, and these will be reflected in lowered costs of fabricated parts. Zirconium equipment is expected to be available in the not too distant future for about twice the cost of stainless steel, depending upon the complexity of the part.

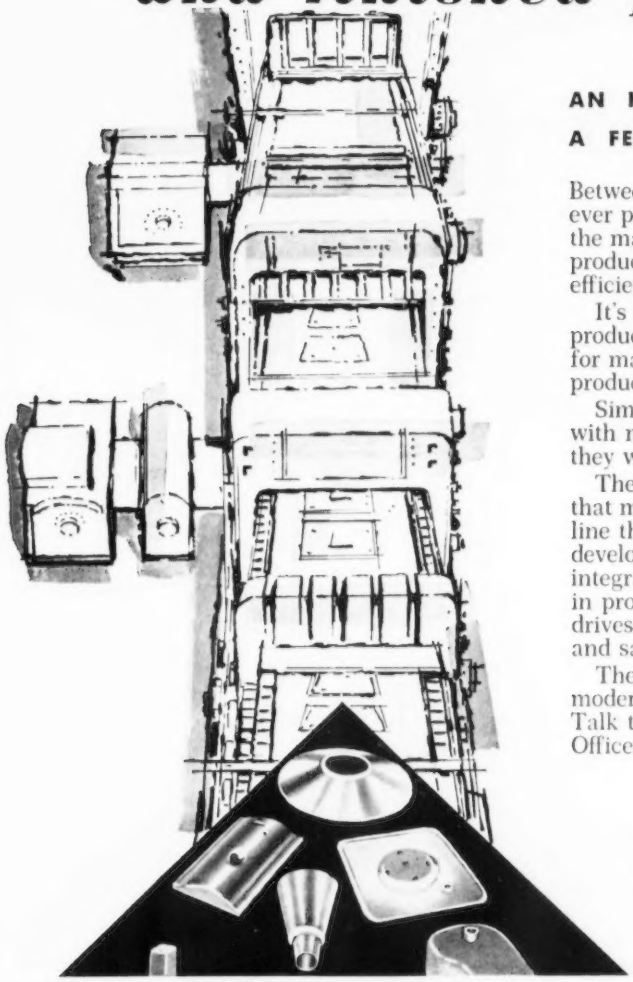
The new U.S.I. production facilities will make available an important new source of zirconium for both government and industrial use. By next year, a million pounds will be available for industry from U.S.I.'s new plant, over and above the million pounds per year committed to the A.E.C. Thus, a reliable source of high-quality zirconium will be available to the nuclear industry and to manufacturers of chemical processing equipment.

For further information write for the new booklet, "Zirconium and Hafnium". For detailed information and assistance on your particular problem, call Bill Greenleaf, Manager of Metals Development.

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corp.
99 Park Ave., New York 16, N. Y.
Branches in principal cities



Between material and finished part...



AN IDEA THAT MAKES SENSE —
A FEDERAL-WARCO PRODUCTION LINE

Between material and finished part is the ever present problem of bringing together the machinery necessary to perform all production on operations as speedily and efficiently as possible.

It's here, the Federal-Warco, this packaged production line has proved to be the answer for many of the nation's foremost production experts.

Simply provide Federal-Warco engineers with material and part information and they will develop a line to do the job.

The advantages: One source responsibility that means faster, more thorough service; a line that is 100% harmonic, all stations developed especially to work in synchronization; integrated and automated handling of work in process; the possibility of utilizing common drives and bases, reducing operating costs and saving valuable floor space.

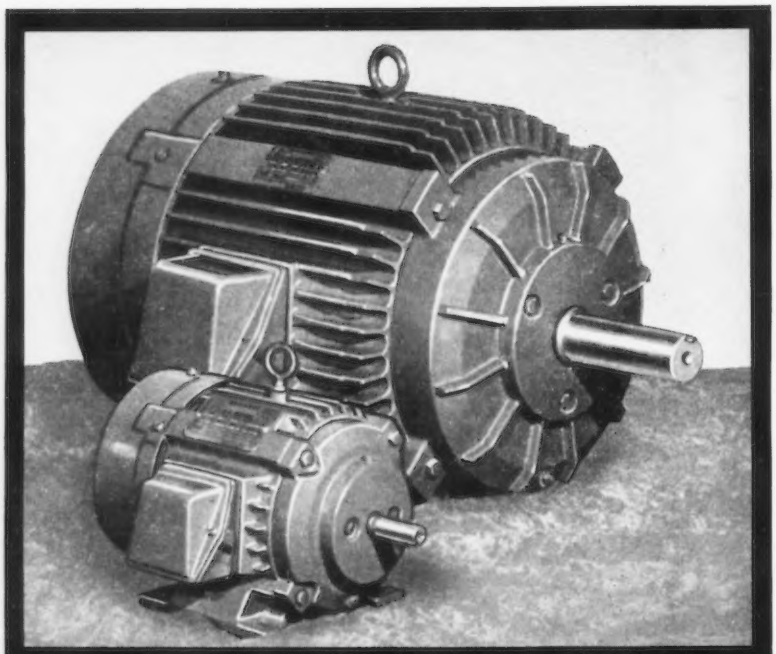
There is much more. Why not look into this modern method of production line manufacture? Talk to your Federal-Warco representative. Offices in all leading industrial areas.

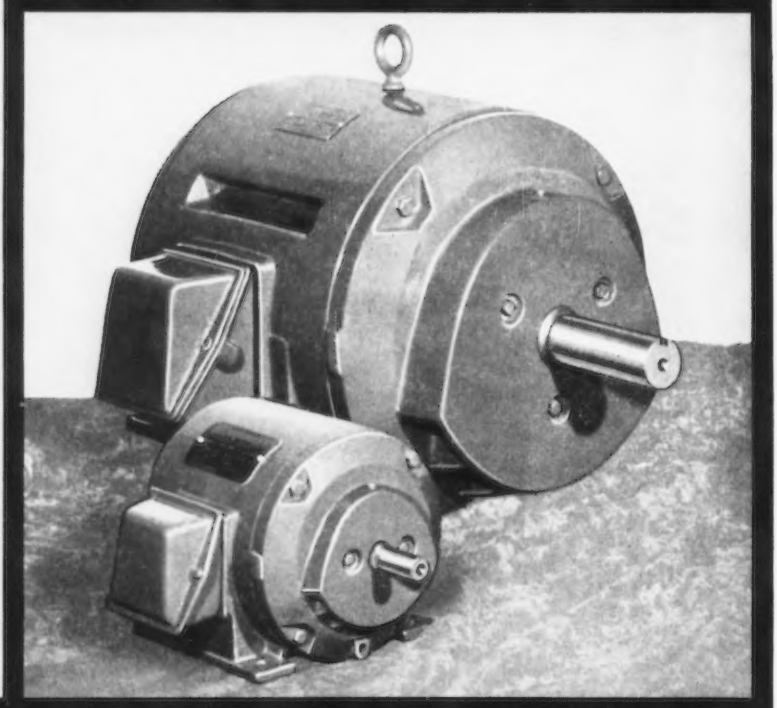
Federal / Warco
PACKAGED PRODUCTION LINES

THE FEDERAL MACHINE AND WELDER COMPANY • WARREN, OHIO

RELIANCE

extends Totally Protected A-c. Motor line to 125 HP.





Reliance's proven Totally Protected design is now being extended thru 125 horsepower.

Now Totally Protected Motors will be available to you from 1 thru 125 hp. in new NEMA ratings.

Immediate delivery from stock today, 1 to 50 hp. Contact your Reliance representative for shipping schedules on other ratings.

B-1573

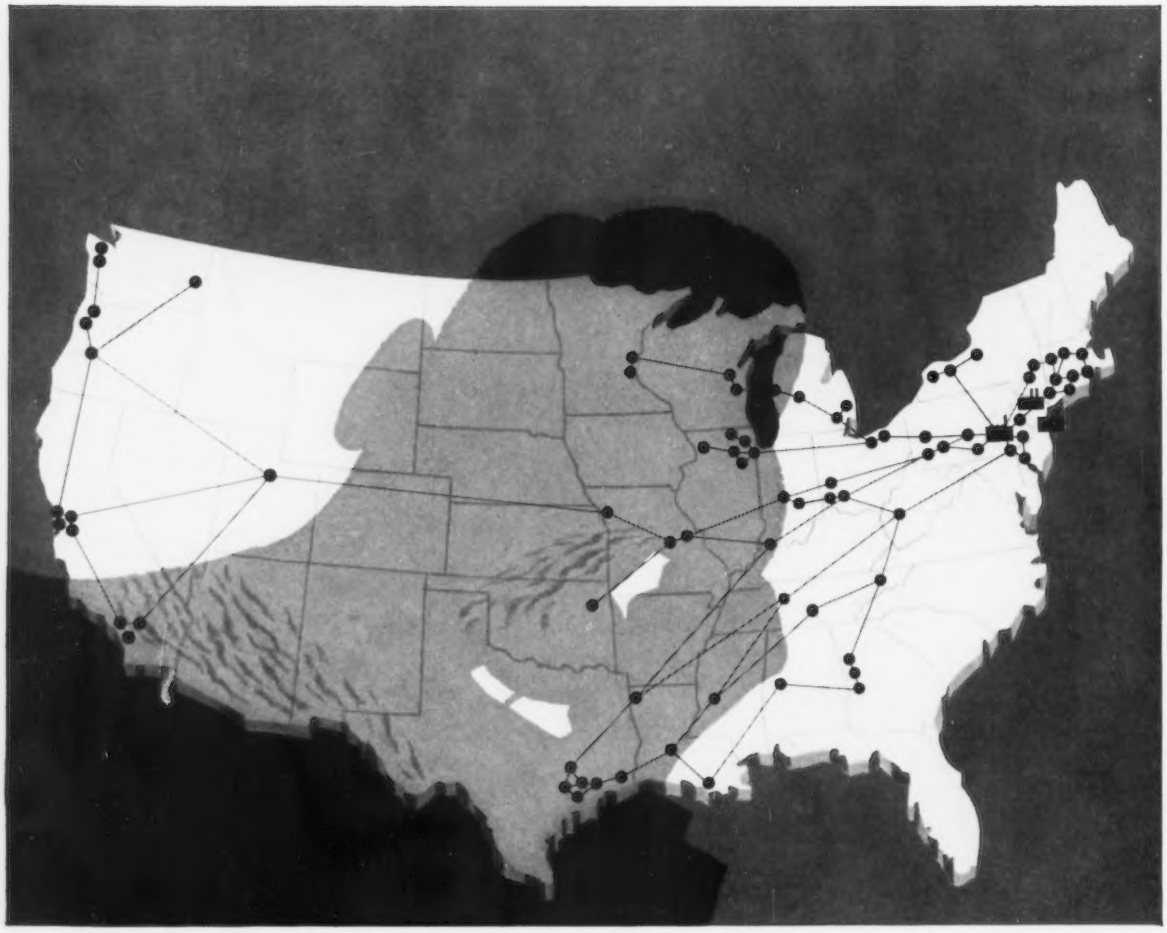
Write or call today for further information

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 212A, CLEVELAND 17, OHIO

CANADIAN DIVISION: WELLAND, ONTARIO

Sales Offices and Distributors in principal cities



Take a new look at where to get faster delivery and service on specialty steels

Wherever you are, there's a Carpenter Mill-Branch Service Center in your area. Have you been in touch with us recently? If not, we believe it will be worth your while to place a call today.

For example, look at your inventory of specialty steels from the standpoint of manpower and paper work required to handle it . . . the valuable space it may be wasting . . . the dollars that may be tied up unnecessarily.

Carpenter's ability to meet your day-to-day specialty steel needs quickly, and without hesitation can do much to help you reduce a host of inventory problems. We're continually building our stocks of tool, stainless and alloy steels for fast delivery.

Important, too, is the cooperation you'll get from the folks at Carpenter. Whether it involves the order desk people—your Carpenter Representative, the warehouse crew or the office staff—they're all part of a team working for you.

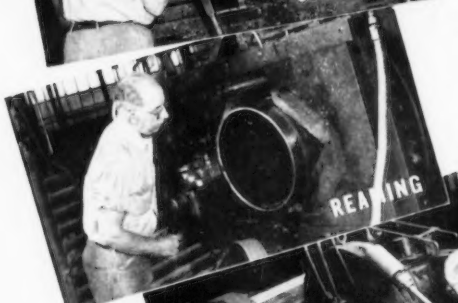
For service that's backed by more dependable action . . . and delivery that's backed by a wider selection of specialty steel grades and sizes—call the Carpenter Service-Center nearest you, now. The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.

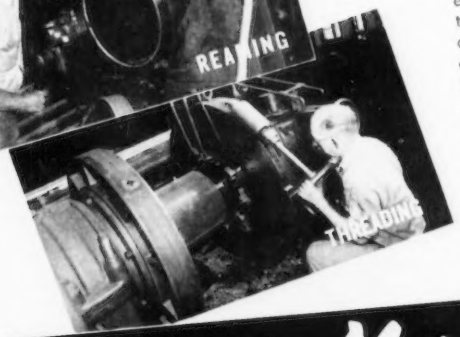
Carpenter

Mill-Branch Warehouse Service

Mill-Branch Warehouses, Offices and Distributors in Principal U. S. Cities

LANDIS PIPE THREADING MACHINES





. . . 4 Major Features Increase Efficiency

1. WIDE RANGE—Just three LANDIS Pipe Machines (2", 8" and 18") will thread all diameters of pipe from ½" to 18". Each machine is constructed so as to handle a wide range of pipe sizes—for example, the 6" machine will thread all diameters from 1" to 6". Universal size adjustment allows quick set-up.

2. DIE HEAD EFFICIENCY—The design of Stationary heads provides maximum rigidity on all diameters within their range. Positive locking action is assured through a self-locking toggle joint. Size adjustment is quickly and easily obtained through the use of a single locking nut.

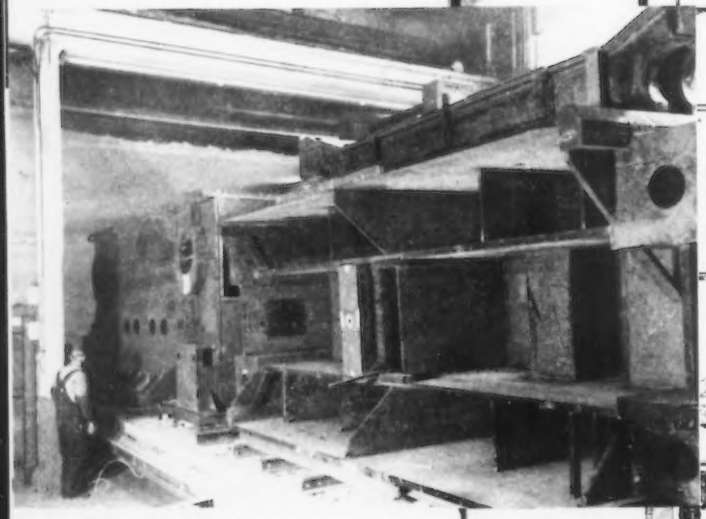
3. LOW TOOL COST—Chasers operate at a tangent to the work. Line contact at cutting edge reduces friction. Permanent throat assures even chip distribution. Variable rake affords proper cutting edge for different materials. Landis chasers are useable for 80% of their original length. They are individually replaceable and, within the range of a given die head, a single set can be used for all diameters of the same pitch, form and taper.

4. PRECISION TAPERED THREADS—The Receding Chaser Pipe Machines are especially designed to cut tapered threads to meet A.P.I. requirements. Chasers recede into the die head at a rate equal to the taper of the thread, ensuring accurate and uniform taper along the full thread length.

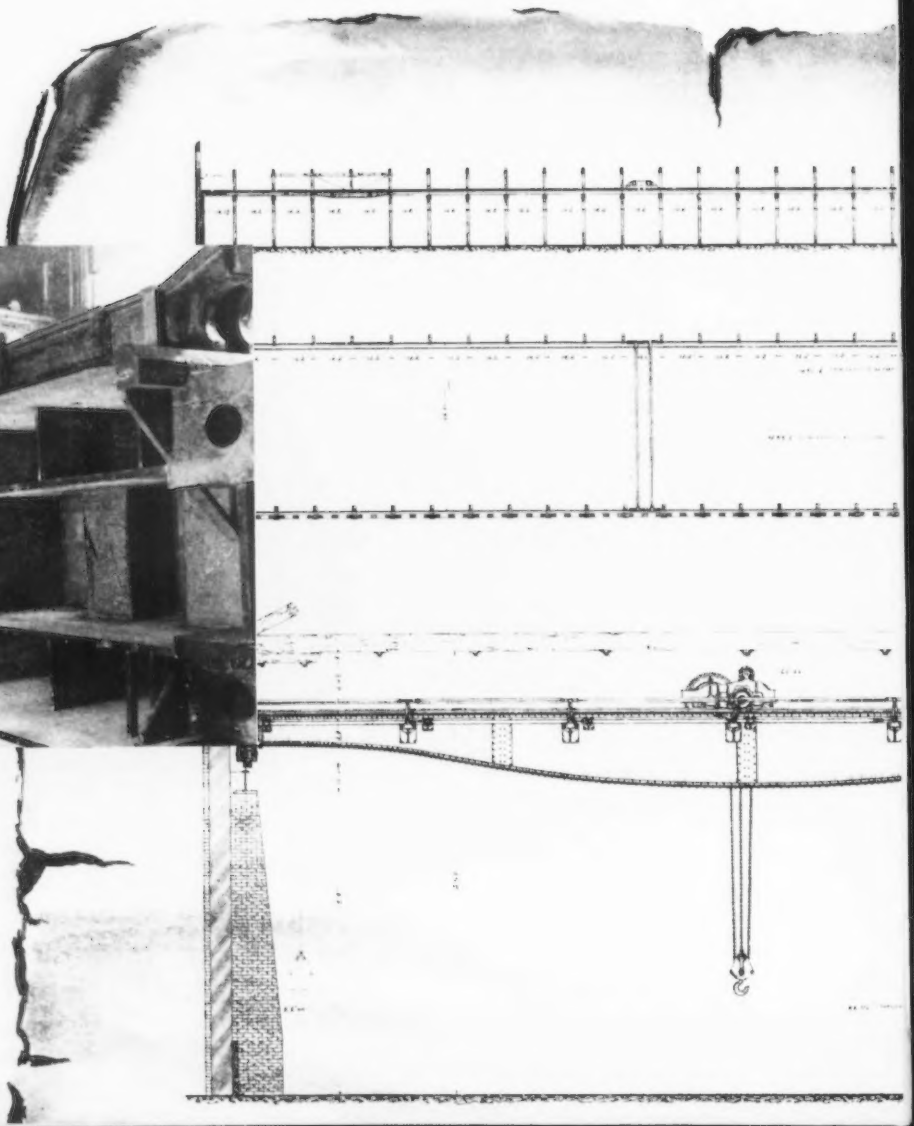
LANDIS *Machine* CO. WAYNESBORO PENNSYLVANIA

For real savings . . . an extra measure of efficiency, safety, dependability

Morgan cranes and mill equipment



TODAY, *this 52-foot stress-relieving furnace is used to make sure that precise alignment of parts is retained in Morgan cranes and mill equipment. Minimum maintenance is assured by careful attention to details . . . a Morgan tradition.*

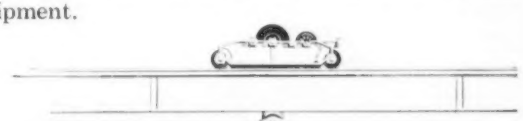


SINCE 1868, the name MORGAN has stood for advanced design and trusted craftsmanship. Close and continuous contact with industry's needs has resulted in a steady flow of improvements in Morgan cranes, mills, shears, saws, roller tables and auxiliary mill machinery.

Creative engineering, new production techniques and quality in every detail have combined to give you greater speed and capacities, lower operating and maintenance costs.

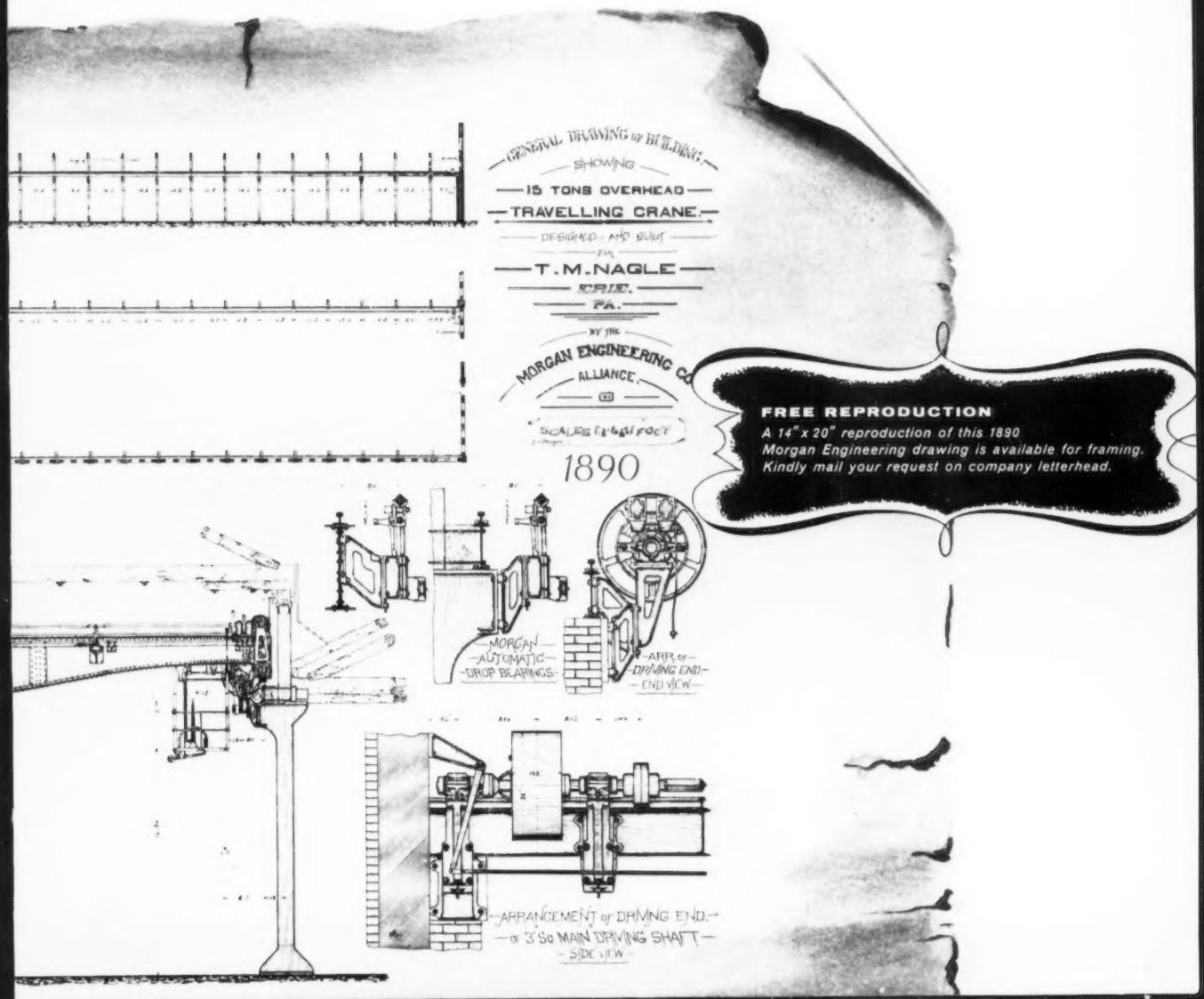
One of many production procedures used to assure the highest degree of dependability is a 20′ x 18′ x 52′ stress-relieving furnace . . . one of the largest automatically controlled installations in the world. It can raise the temperature of a 250,000 pound load 200°F per hour, up to a maximum of 1750°F. Stress-relieving assures that precise alignment of gearing shafts and other parts will be retained . . . that maintenance is held to a minimum in Morgan products.

Let our representative help you plan for *real* savings . . . longer service life, lower operating and maintenance costs with Morgan cranes and mill equipment.



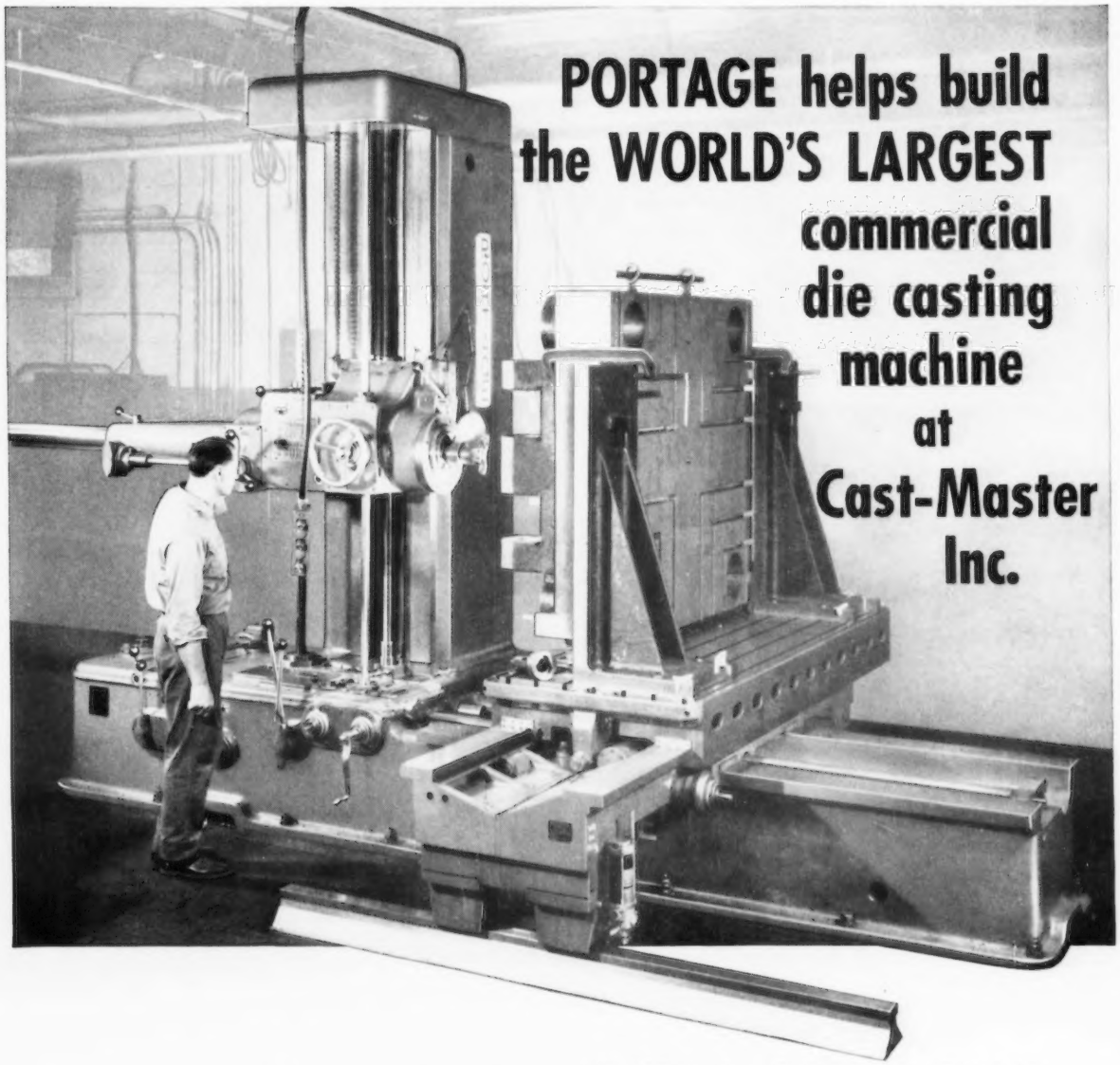
THE
MORGAN
ENGINEERING CO. *Alliance, Ohio*

Overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws and auxiliary equipment

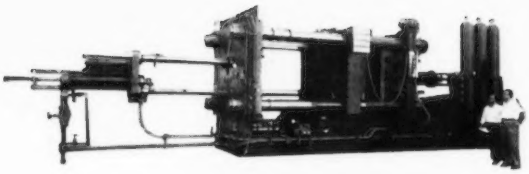


FREE REPRODUCTION

A 14" x 20" reproduction of this 1890 Morgan Engineering drawing is available for framing. Kindly mail your request on company letterhead.



PORTAGE helps build the WORLD'S LARGEST commercial die casting machine at Cast-Master Inc.



The world's largest Die Casting Machine is 10 feet wide, 13 feet 4 inches high and 42 feet long. Gross weight is 205,000 lbs.

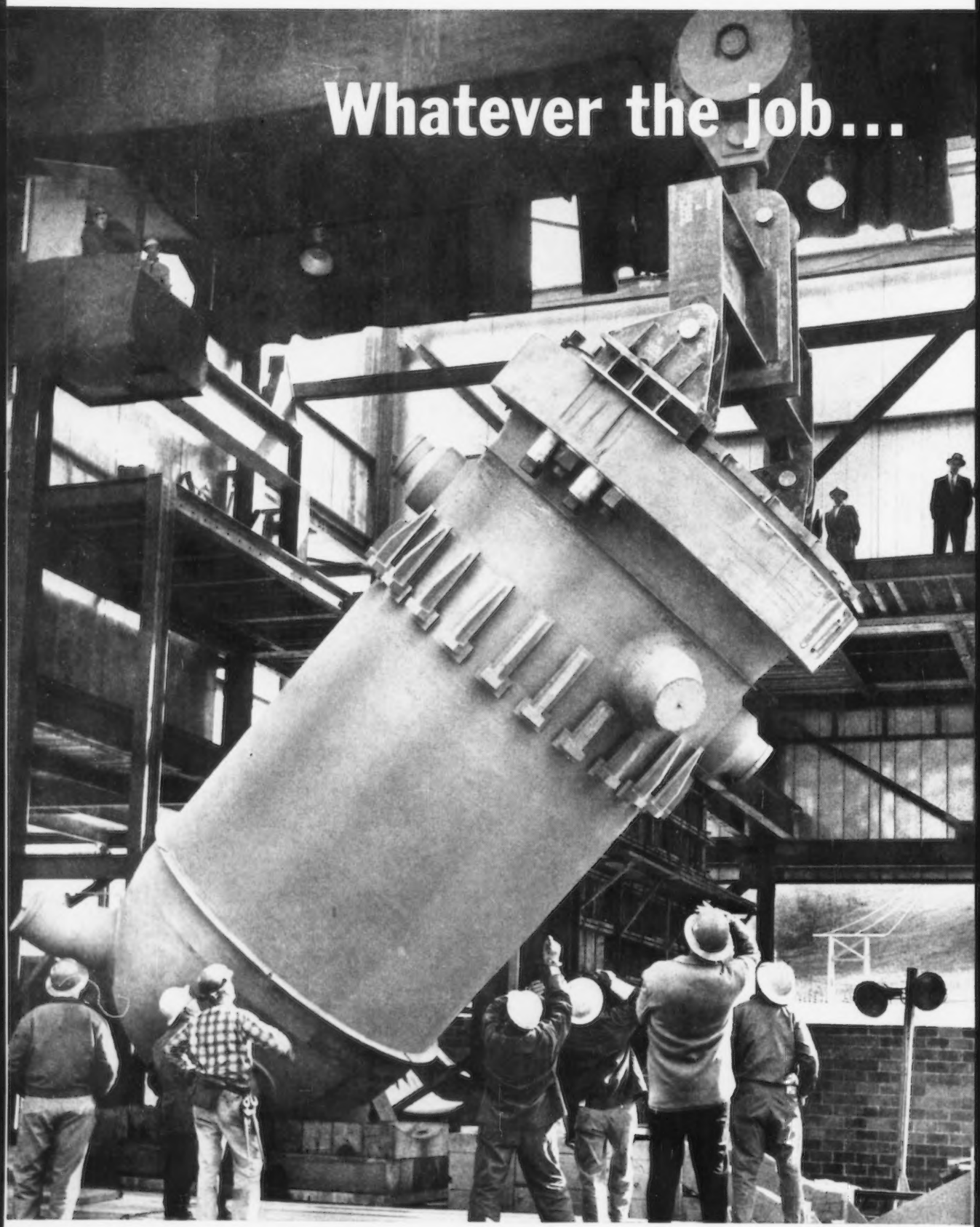
Cast-Master, Inc., Bedford Heights, Ohio holds the distinction of manufacturing the world's largest commercial die casting machine . . . and Portage Horizontal Boring, Drilling and Milling Machines played an important part in its construction. The first Portage Mill was purchased by Cast-Master in 1946, today, four machines are in daily use. Both management and shop personnel report very excellent performance and low maintenance costs on the Portage Mills. Ask your local representative about the NEW *over-all* heavier 4" or 5" machines or write direct for literature . . . and remember . . . dollar for dollar you can't beat a PORTAGE.

THE Portage MACHINE CO.

1035 Sweitzer Avenue • Akron 11, Ohio

Representatives in Principal Cities

BUILDERS OF PRECISION MACHINE TOOLS, SPECIAL AND PRODUCTION MACHINERY SINCE 1916


Whatever the job...

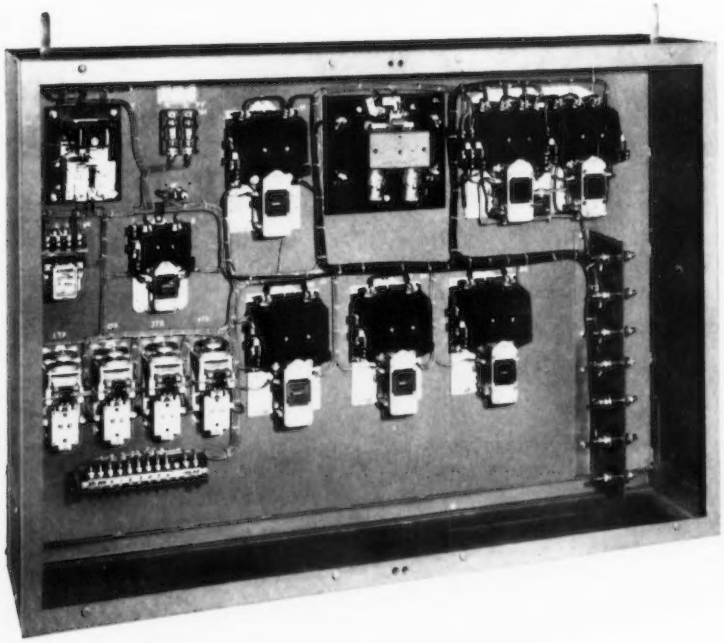
you need Westinghouse Load-O-Matic . . . the modern precision crane control

You may never need to handle anything as delicate as this atomic reactor, but the one really up-to-date means of controlling your a-c crane for any duty is the Westinghouse LOAD-O-MATIC® control.

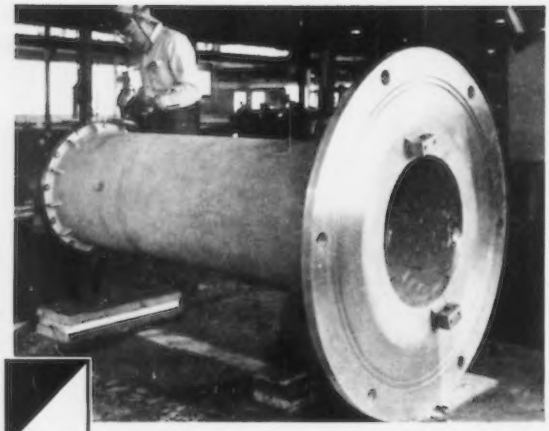
LOAD-O-MATIC utilizes static reversing, thus doing away with troublesome reversing contactors. The stepless feature of LOAD-O-MATIC, effective down to and including zero speed, eliminates the necessity for old-fashioned "inching" or "jogging" and permits infinite speed control in spotting loads. These features also cut maintenance costs by as much as 60 percent over conventional crane control.

The LOAD-O-MATIC system utilizes the drive motors for electric braking, greatly increasing the life of mechanical holding brakes and cutting crane operating costs. Precision, economical LOAD-O-MATIC can be utilized on any crane . . . at only slightly higher cost than old-fashioned crane control. For complete information, see your Westinghouse sales engineer. Or write Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pa. J-22072

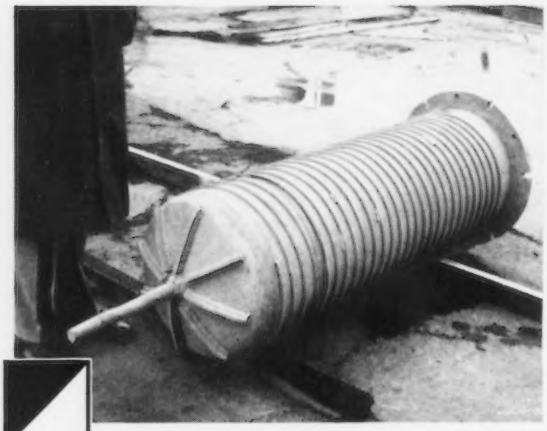
YOU CAN BE SURE...IF IT'S Westinghouse



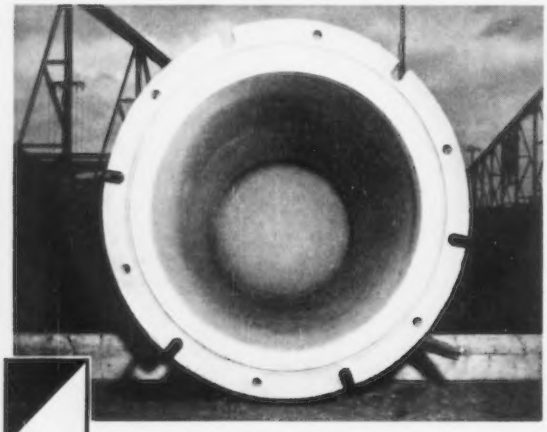
CONTROL PANEL OF LOAD-O-MATIC is easily accessible, with front wiring throughout. Devices included are rugged, industry-tested Westinghouse units.



23" Diam. Copper Crucible for Vacuum-Melting of Steel, completely fabricated and machined, ready for installation.



Copper Mold with Water-Circulating Ribs.



Copper Mold for Melting Titanium.

Welding Copper Ribs on Heads for Copper Crucibles.

VACUUM MELTING CRUCIBLES BY WELDCO

FOR TITANIUM AND ALLOY STEELS

We have had extensive experience in making Copper Molds, Jackets, and Furnaces for Vacuum-Melting of Alloys. Progressive producers are boosting their quality sharply by using the Vacuum-Melting Process. Why not investigate the possibilities?

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY
3805 OAKWOOD AVENUE . . . YOUNGSTOWN 9, OHIO

Buying stainless steel plate from Jessop is like owning your own mill

When you order from Jessop you don't wait in line. Jessop operates a compact, highly adaptable stainless plate department—all under one roof from melting to finishing. Production schedules can be adjusted overnight to suit your need. Moreover, with the 3rd largest stainless plate mill in the country now in operation, sizes are available up to 80″ in width and 240″ in length. And Jessop's years-ahead chemical control equipment quickly identifies tramp elements in the molten bath—permits their removal so you will enjoy improved forming and welding characteristics in the finished plate. You'll find it will pay to send your next inquiry to Jessop where doing business is like owning your own mill.

CONSOLID… CO.

To: JESSOP STEEL COMPANY

Quantity

Description

Rush!

DELIVERED

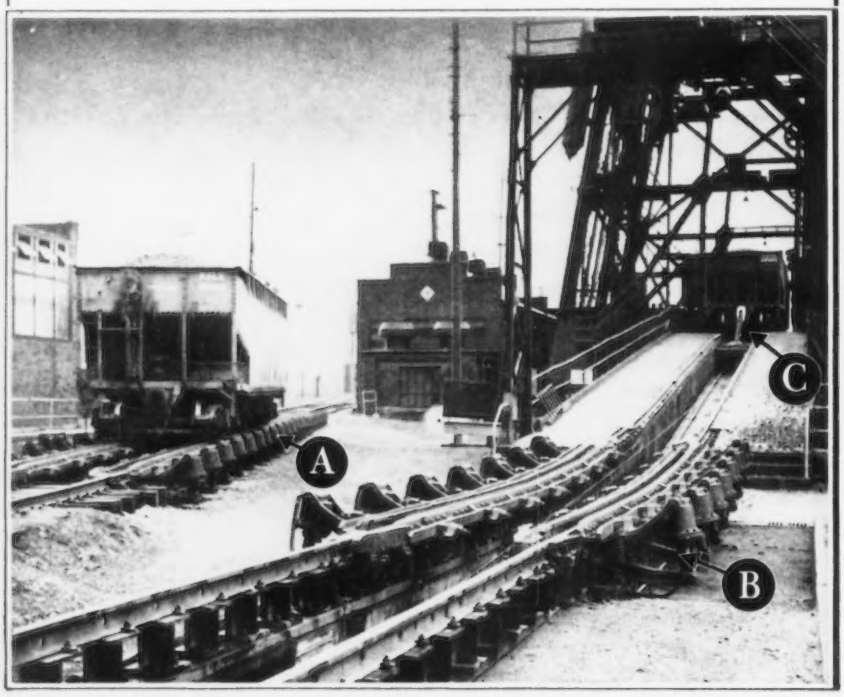
JESSOP

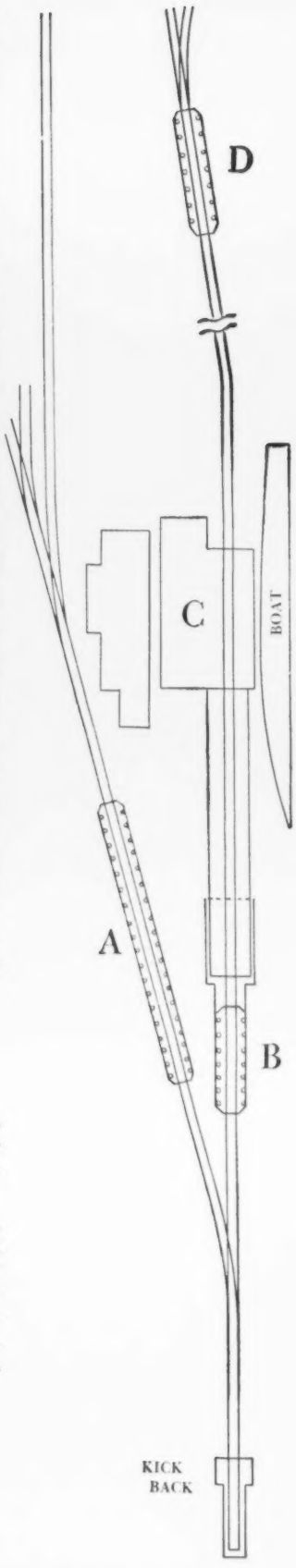
STEEL COMPANY • WASHINGTON, PA.

OFFICES IN PRINCIPAL CITIES

Wholly-owned Subsidiaries: Jessop Steel of Canada Limited, Wallaceburg, Toronto
Jessop Steel International Corp., Chrysler Building, New York, New York
Green River Steel Corporation, Owensboro, Kentucky

FAST AND EFFICIENT MATERIALS HANDLING—Loaded coal car rolls down the incline on the left at about 15 miles per hour. Its speed is reduced automatically in car retarder (A) so that it rolls up a "kick back" at just the right speed to send it back to retarder (B) where it is stopped automatically. A "barney" then pushes the car up the slope to the car dumper (C) where coal is unloaded directly into the ship. The next full car pushes the empty car off the dumper. It rolls down through retarder (D) to the proper track. All this is done by push-button control.





Automation with UNION CAR RETARDERS cuts costs on coal-loading dock

Forty carloads of coal an hour can be loaded on shipboard with this coal-handling system at a Lake Erie coal dock at Conneaut, Ohio.

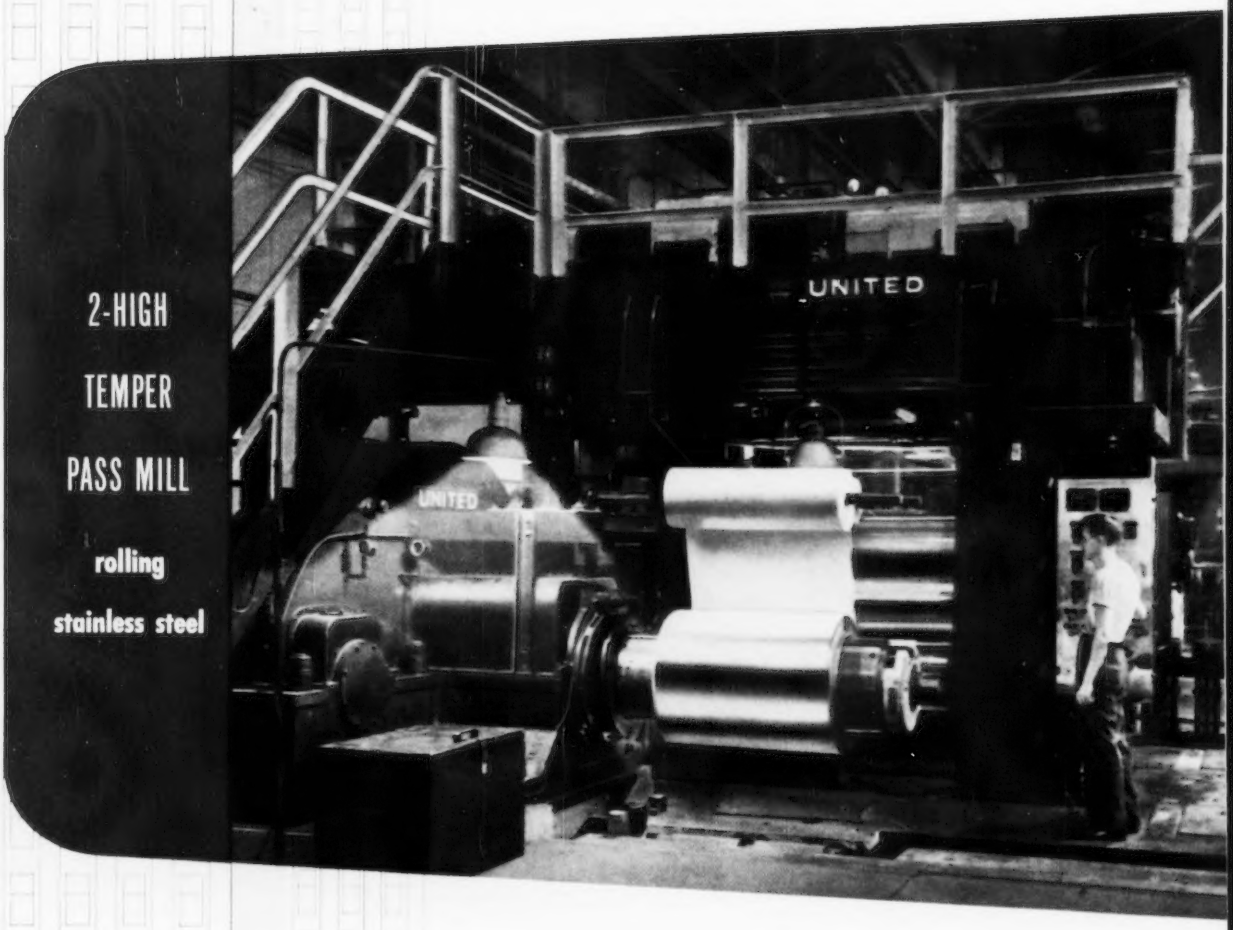
This job formerly required a crew of men riding the cars and working the hand brakes—a hazardous occupation. Insurance rates were high and frequently men had to wait for the next ship to be loaded.

Now the work is handled quickly and safely by a push-button system using UNION Electro-Pneumatic Car Retarders. Costs have been greatly reduced and hazards eliminated.

If you have a materials-handling situation involving many carloads of coal, ore or other products, let us show you what can be done with automatic car-retarder systems to increase efficiency and reduce costs. Write for complete information.

UNION SWITCH & SIGNAL
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY
SWISSVALE, PENNSYLVANIA

NEW YORK ..... PITTSBURGH ..... CHICAGO ..... SAN FRANCISCO



Designed and Built by

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at:

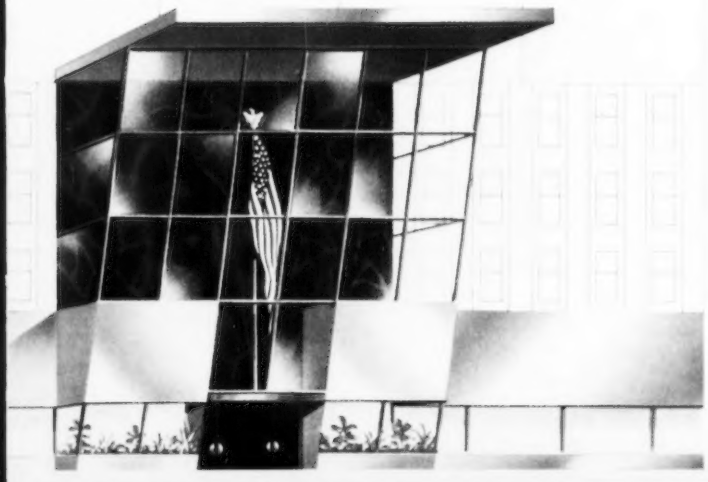
PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON • WILMINGTON

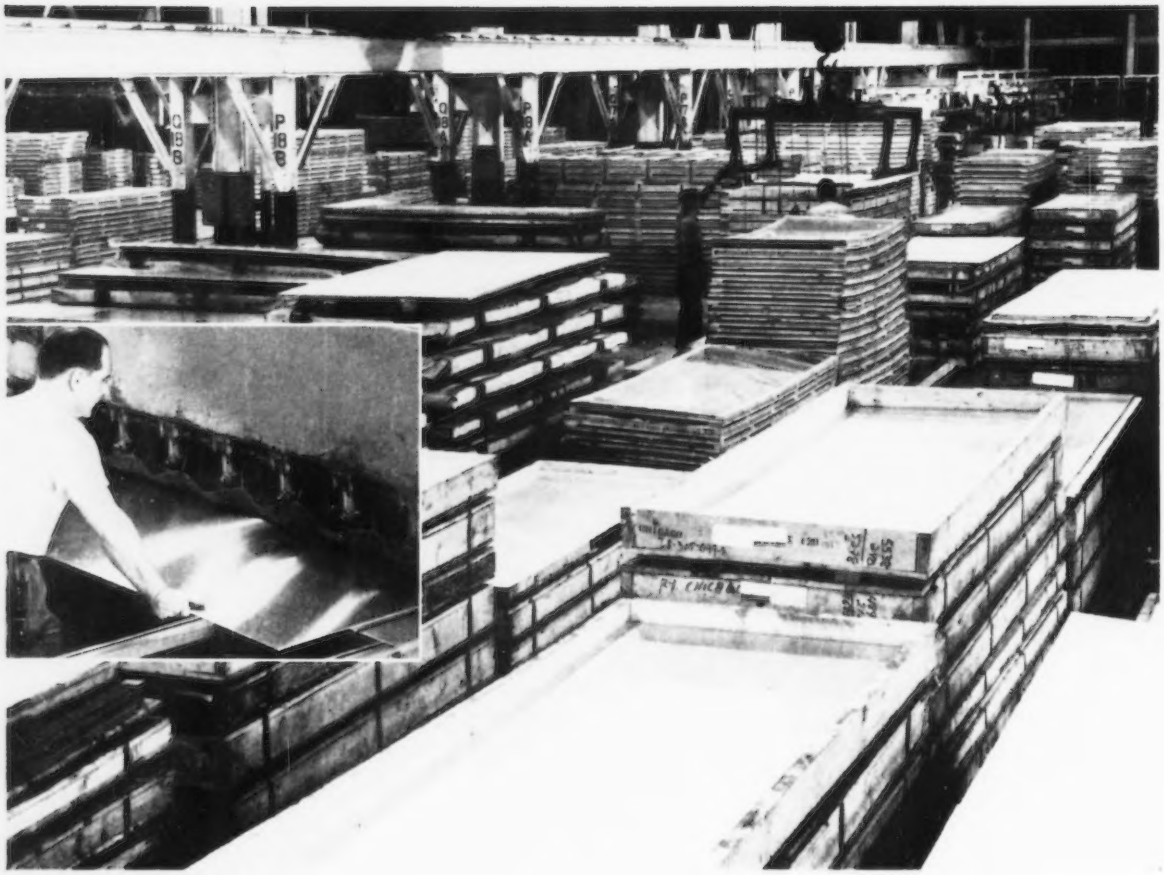
Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO
STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

UNITED *can serve you no matter where in the world you are.*

STAINLESS STEEL BUILDING ENTRANCE





Why do more stainless buyers call Ryerson?

There are four main reasons:

First, the nation's largest stocks of Allegheny stainless are always on hand at Ryerson—2351 types, shapes, sizes and finishes . . . tons of sheets, plates, bars, angles, pipe, tubing and fittings.

Second, Ryerson knows stainless. As the pioneer supplier of stainless from stock, Ryerson has worked with more stainless users, helped more firms to use the right type to the best advantage. This experience is always available to present and future users.

Third is the equipment for cutting stainless to your specifications. The most modern shears, saws, and flame-cutting machines produce accurate sizes and shapes, in any quantity.

And fourth is Ryerson's ability to deliver any requirement, any quantity—on time.

When you need stainless, or help on stainless problems—call your nearby Ryerson plant.

RYERSON STEEL

Principal Products: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.

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"Printed" Transistors

A new printed-circuit method for making transistors an integral part of electronic "brain" circuits means that missile guidance systems can be much smaller. Army scientists hail the discovery as the missing link in their drive to cut bulk and weight of missile "brain" boxes. Transistors made this way are about 1/20 in. wide and 1/100 in. high. Electrodes are formed by vapor deposition.

Aluminum Hopper Cars

More aluminum hopper cars are on the way. Thus far two aluminum companies have ordered them for their own use. Railroads are catching the light-metal fever to a more limited extent. They will, however, use more aluminum, mostly for car tops, car doors, and storage racks.

Near East Just a Decoy?

The next Communist military adventure is likely to start in the Far East. Moscow-inspired trouble in the Near East only screens the true intent, some foreign-affairs experts believe. Basically, they feel, the Reds are gambling that the U. S. wants no part of another Far East war, and won't interfere if one boils up.

Study Engineers' Wages

The Government will conduct a crash program to inventory the nation's pool of scientists, engineers and technicians. It's a step to beef up lagging research. Study will compare government and industry salary scales, fringe benefits and related factors. Results will be used next year in efforts to overhaul government pay schedules for these critically important workers.

Fatigue in Leaded Steels

Lead additions of about 0.2 pct don't affect fatigue strengths of alloy steels having ultimate tensile strengths below 130,000 psi. In 170,000 psi steels, however, lead drops the mean fatigue strength about 8 pct; in 275,000-psi alloys, the drop is about 16 pct. Notched specimens of leaded and non-leaded steels show little or no difference in fatigue strength.

Roll Bonding Moves In

The Air Force is testing a roll boaded stainless steel sandwich-type panel for use on exterior surfaces of guided missiles. The idea may or may not work out. But experiments like these back up expert beliefs that roll bonding, now used mostly with aluminum tubing, will soon spread to other metals. Copper appears to be the most likely target at the moment.

Need Pelletizing Plants

Some South American and Canadian iron ore properties have a major problem with ore fines. Several loads of direct shipping ores were rejected this year because of them. Companies are thinking about putting in pelletizing plants to reclaim this material. Such pellets would fit in easily with present taconite-smelting practice.

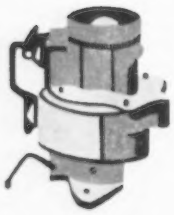
Vacuum-Deposit Cadmium

Applying cadmium to steel parts in a vacuum chamber is one way to avoid the hydrogen embrittlement that accompanies electroplating. A major aircraft firm uses vacuum metallizing to cadmium coat many of its production parts. Normal coatings are between 0.0003 and 0.0005 in. thick. They meet all Federal specifications for corrosion resistance and other key properties.

Molybdenum Pinch Eases

Molybdenum users are breathing easier about supplies. They also look for price problems to be adjusted about the first of the year. Big pinch, caused by a Climax Molybdenum strike, had one big steel mill down to a five days' supply. Canadian imports have helped but they carry a duty extra of 37 cents per lb. Expected lifting of this charge on January 1 will be welcome news.

Prevent corrosion & protect metals without painting



- Lithoform® Z for zinc
- Alodine® 1200 for aluminum
- Permadine® for steel

Lithoform Z forms an amorphous chromate coating on zinc and cadmium surfaces which retards the formation of *white rust* or *bloom*. It is effective on most types of electrodeposited zinc, zinc die casting alloys, hot-dipped galvanized surfaces, and cadmium plated products.

Alodine 1200 forms an amorphous chromate film on aluminum which becomes an integral part of the metal and improves the natural corrosion resistance of the metal. In addition to protecting unpainted surfaces, it is a durable and tenacious base for paint.

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CHEMICALS ACP PROCESSES

How a New Product Developed— From Idea to Market

Black & Decker's magnetic drill press took four years to grow from a hint of a new product to actual sales.

This case history traces step-by-step the development of the entire new product.

▪ This fall the Black & Decker Manufacturing Co. added a new product, a 1¼-in. magnetic drill press, to its extensive line of portable tools.

Four years elapsed from the time the Product Planning Committee first decided to explore the market for the magnetic press. During that time, market research, the various aspects of engineering, production, purchasing, sales, and promotion all played their parts in the broad area called product development.

Good Results—Although it's too early to predict eventual success, first reports indicate sales are going very closely to expectations.

For that reason, development of the new magnetic drill press is a good case study of new product development, from the initial stimulus to the purchaser. The pattern could apply to a wide variety of products.

The new tool has a magnetic base

PRESENTATION: Executives went all-out showing sales managers just what the magnetic drill press will do. Response was enthusiastic.

Putting full weight on the drill is J. H. Porter. Robert Riley has his hand on the trigger. A. S. Boehm is at left with megaphone. All took important parts in the development.

"In this case, it was necessary to set up a team effort."

and is used primarily for drilling and tapping steel or iron plate where it is not practical to move the work to a stationary machine.

By attatching the magnetic base to the work surface, it is possible to drill overhead or vertical surfaces, structural work that is already in place, or similar heavy metal jobs when access is difficult.

Idea Strikes—The company first became interested when it learned that a substantial part of its production of 1¼-in. drill was going to manufacturers already making magnetic presses. Over portions of 1953 and 1954, the market was studied informally. In late 1954, the Product Development Committee, following the suggestion of Raymond G. Horner, vice president of sales planning, directed the Engineering Dept. to look into the development of the unit and make estimates of development costs.

Many Problems—Says Robert Riley, chief administrative engineer:

"This was a completely new field —a completely new product. . . . It was not possible to hire engineers trained for this development, but rather to take engineers already in the company employ and have them perform sufficient research to develop the technical information.

"In this case, it was necessary to set up a team effort to investigate all phases of the new development. The team consisted of members from electrical design, mechanical design, testing sections, assisted by the Market Research Dept."

Market Probed—First step was to purchase competitive units. These were studied, tested, patients checked; lists made of sizes, weights, holding power, and other information.

Engineering Test Dept. measured and evaluated the units and suggested design features that would be desirable and necessary. Market Research was asked to study the market, find out what features potential customers considered desirable.

"The complete assembly of these ideas naturally led to an over-all conception of appearance of the unit," Mr. Riley recalls, "and artist's drawings were made to study possible designs, with the thought in mind that functions are important, but appearance must also be considered."

Plan of Attack—After some idea of the profit potential of the new tool was determined, says Richard Wells, manager, Market Research Dept., "we were given this formal assignment:"

1. Familiarize ourselves with the magnetic drill presses on the market from standpoint of product features as well as pricing policy.

2. Determine what types of firms were buying these units and for what purpose.

3. Gather information indicative of the market potential.

4. Determine what share of the market Black & Decker might expect on introducing a similar unit.

5. Determine what specific competitive features were liked or disliked by users, and what improvements can be made to make a similar unit more saleable.

Need for a portable magnetic drill press was "virtually assured" because of the problems or impossibility of bringing the drilling job to stationary equipment.

Users were classified in seven major metalworking groups. These are: Manufacturers of boilers and large tanks; shipbuilding and repair; jig and tool and die shops; structural steel fabrication; sheet metal fabrication; welding and heavy machinery repair shops; heavy machinery manufacturers.

Learn from Users—This was learned from polling users:

A light in the base was desirable for working in dark areas.

The tool should be built for intermittent use, but there was enough demand for continuous duty to warrant consideration.

A safety chain would be an advantage.

A reverse switch should be standard equipment for tapping.

A better method of locating the drill bit without having to move the magnetic base should be developed.

Magnetic power margins should be furnished to withstand loss of power.

An off-center drilling adjustment would be helpful in drilling holes close to walls.

Broad Sales Potential—To determine over-all market potential, probable users were broken down by S. I. C. classifications, and number of firms who were potential users was determined.

"We were reasonably certain," Mr. Wells says, "that only a fraction of these potential customers had actually purchased one of the units that was on the market.

"We felt that . . . we could safely set a projected sales goal for the first three years after introduction. Depending upon the amount of promotion and effort that we would put behind the product, there was a good possibility we could even exceed our estimate."

Production scheduled — The formal market research report was issued in March of 1956 to the product development committee. The committee authorized engineering to place the magnetic drill stand on its production schedule. Tentative assembly date was set for the Production Dept. for April, 1957. The Sales Dept. planned an introductory campaign to be announced in August, 1957.

Own Design — Electrical engineering design section had the job of designing the complete magnet to meet the specifications set down by the testing dept.

At first, outside technical help was thought necessary, and specifications were sent out, but Black and Decker engineers also proceeded independently on design. Their mag-

net eventually proved satisfactory.

Two Piece Construction—Nature of its use indicated it would have to be carried up ladders and set in inaccessible places. For this reason, two-piece construction was decided on.

The two-piece construction led to many other problems, particularly the accuracy of drill point and method of locating the drill point. Following a study, a new method of drill point location with a finder was added to the machine. A "caddy-car" was developed for ease of transportation.

Safety Factors—The problem of safety was carefully studied. Safety features included the safety chain with eye bolts. Extra magnetic pull was developed to allow for varying conditions.

A safety grip switch was developed for the magnet. This leaves the magnet "on" when the trigger is released. A reversing drill motor was provided for tapping operations. This is just a sampling of features that had to be developed and incorporated into the design.

Customer Research — By July, 1956, a full scale working model was developed and taken into the field for customer reaction. Overall acceptance was good, but there were some negative comments.

Another model was designed and submitted to the product development committee. Arthur S. Boehn, sales manager, Industrial-Automotive Div., suggested a hydraulic feed mechanism.

This is now one of the key features. It improves accuracy of the drill by providing uniform pressure and speed. It greatly increases versatility by permitting operation by remote control in areas where it would be difficult or impossible for an operator to stand.

Other Departments—During this interval, the purchasing dept. obtained suppliers for parts. Manufacturing departments were consulted closely as design progressed. Tool Design worked on a special winding machine for the magnet coil plus the special gages and fixtures.

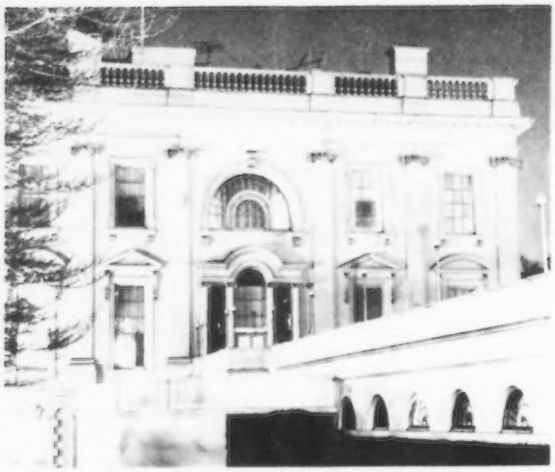
With final design approved and the manufacturing dept. in manufacturing operations, a sales plan took form. The new product developments were brought to the sales planning committee.

Product Development Time Table For Black & Decker's Magnetic Drill Press

1953	Interest aroused in market potential for magnetic drill press.
1954	Product Development Committee directs Engineering Dept. to look into development of the unit and to work up tentative development costs.
Dec., 1955	Product Development Committee launches full-scale investigation by Engineering and Market Research Depts.
March, 1956	Market Research Dept. reports to Product Development Committee, with result that Engineering Dept. is authorized to place magnetic drill stand on production schedule.
July, 1956	Full-scale working model available, sent into field for on-the-spot reaction.
Oct., 1956	Final design is approved, drawing released to Production Dept. for actual manufacturing operations.
April, 1957	Assembly date for Production Dept.
August, 1957	Sales Dept. campaign announced.

Sales Plan—G. Harvey Porter, advertising manager, Industrial-Automotive Div., outlined the steps in the sales and promotion phase of the product development story.

Selling features of the tool were pinpointed, with the most important features to be stressed outlined. It was now ready for the market.



THE WHITE HOUSE: The extreme tension which immediately followed the President's most recent illness has relaxed. But many questions are still unanswered about effects on the nation and world.

Ike's Impact on Business Outlook

The President's illness comes at a poor time for business. But it need not impede expected rebound.

Ike's complete recovery would help business over short-term rough spots that lie ahead.—By Tom Campbell.

▪ Reasonable — and unreasonable —doubts about the President's future course must be cleared up to remove completely the impact of his illness upon business thinking. This will come by a further and exceptional recovery and by his own clearcut decision on his future action.

At present the viewpoint in Washington and in the Administration is that he will not have to even consider relinquishing the presidency. But that isn't the viewpoint of many doctors and businessmen throughout the country.

Poor Timing—Since much emotion is involved in the current business temperament, the minor stroke suffered by the President came at a most inopportune time—for him and for the country.

Some of the most difficult problems of the Administration are coming to a head. To name a few: Defense spending, the Red scientific threats, NATO meeting, a growing but mild recession, coming elections and Congressional hearings. These cannot be solved by medical bulletins or by Washington press conferences.

No Real Danger—It is clear now that the President's illness has been a minor one with unexpectedly rapid recovery. The facts seem to show that there is no real danger to the President's health. In small print it is indicated that he must have rest and that he must go back to the rigid program to safeguard his health. He must curb his appetite for long, hard work, extended discussions, and tension - laden decision-making.

Dismissing the armchair diagnosticians, the militant partisans, the cautious opposition, and those with special axes to grind, what impact has the President's illness had on business? Since the economy was already being tested forty ways to Sunday, the sudden news from the White House tended to deepen the gloom, increase the caution and perhaps speed up negative factors already inherent in the current picture.

Businessmen Worry—Most businessmen would not talk for publication. They don't want to be labeled as alarmists, as gloom makers, or as politicians. Privately many industrialists are worried about the effect of the President's stroke upon the business outlook. But as time goes on—a great amount of this anxiety will disappear.

The longer it takes for things to get back to normal at the White House the longer it will take to remove industrial overtones of the President's latest illness. By now, though, the impact should be less than the previous ones if there is anything to the law of diminishing returns. This is Mr. Eisenhower's third serious illness, each time he has staged a miraculous comeback. There will always be the fear in the background that his next illness may be a more severe one; but this is offset by the feeling that Ike leads a charmed life.

Different Setting—More reaction to Ike's illness than is warranted may have occurred. Ability to "reach" people with the facts has been difficult in the face of previous

fears of a recession, depression, or correction. In Mr. Eisenhower's two previous crises, business was on its way up; not down. Therein lies the danger of the psychological factors involved in the current crisis; things are on their way down now.

There may still be shocks ahead for industrialists. If, as expected, the President stages a complete and rapid recovery and later another setback occurs, the impact on business would be severe. This means that the President's health is now inextricably involved in the future business outlook.

Crises And Business—The current business "pause" will be little affected — in total — by what has happened to Mr. Eisenhower or what his future course will be. These factors only accentuate conditions which are already under the surface. Whether such crises actually change the net trend of business is highly debatable. Chances are they don't.

The President's illness may have shaken down negative business factors by increasing their depth and speed over what might have happened had there been no crisis. If that is so then we can expect that the business correction will be completed faster than expected—especially if Mr. Eisenhower's future course is clarified quickly and constructively.

More Important Factors — Of more importance to industrialists is the speed and logic with which defense spending, easier money, and Administration anti-deflation moves are handled. Much of Mr. Eisenhower's work has been delegated for some time, with him making the final decisions. That will continue to be the case in the future. Industrialists interviewed have so many troubles of their own that they are not placing undue attention upon the current White House crisis; they do admit that it will have a negative psychological effect on business even though such an effect is temporary.

Separating emotional from objective business thinking, it is safe this week to say that Ike's slight health setback will be eventually interpreted as are those of most any mortal in his age bracket. It is the consensus that the "news" has accentuated the downturn in business and its impact will linger as long as his rest and partial withdrawal from his job continues.

Metalworking Outlook — There is no evidence that industrial hysteria over future business conditions was caused specifically by the President's health. There is some evidence that a small amount of business hysteria had cropped up before the news of the President's attack.

Close checking and analysis indicates at this time that: The metalworking economy is not headed for a repetition of 1954; Mr. Eisenhower's setback will not turn the "correction" into a more serious and longer decline; counter moves in the economy are already taking place and will operate more fully later in the year.

Potomac Facts and Rumors

The President Puzzles the Experts:

Fact

1. The President had a minor cerebral attack—called a "small" stroke in everyday language.

2. Mr. Eisenhower's recovery surprised his own doctors.

3. There is no evidence that the President's attack presages a subsequent one.

4. The President has as yet given no thought to resigning.

5. Mr. Eisenhower's illness underlines recessive business characteristics but does not change them.

6. Something had to be said to prevent nationwide panic.

7. It will take time and rest to resolve the President's remarkable improvement and recovery.

8. Surviving a minor stroke does not leave judgment or thinking abilities impaired.

9. Naturally the President and his aides want to accept the most optimistic outlook.

10. Cerebral accidents can happen to anyone at any time; they are not necessarily followed by others.

Rumor

1. The President is worse than reported; his staff is covering up for him; backstage work goes on.

2. Medical bulletins have been studied public relations jobs.

3. The President's attack is the first of others to come because of his age and previous illnesses.

4. The President will resign and pass job to Mr. Nixon.

5. Mr. Eisenhower's illness will turn a mild recession into a serious recession.

6. The press conference was called for political purposes.

7. There are serious days ahead for the President regardless of reports to the contrary.

8. The speech impediment or difficult memory recall suggests deeper trouble.

9. Naturally the cynics and pessimists believe—or want to believe—the worst.

10. The cerebral accident denotes a cause directly connected with his two previous illnesses.

Wider Aluminum Sheets Emerge From Specialty Class

New Alcoa cold-finishing mill rolls wider sheets with much narrower tolerances.

Airframe builders and others benefit from new, wide sheets rolled on United Engineering-built mill.

■ New heavy equipment is squeezing the fat out of wide aluminum sheet and putting a specialty operation on a production basis for one supplier.

Aluminum Company of America has just narrowed its gage tolerances for sheets in the range of over 50 in. to 84 in. wide and .040 to .125 in. thick. By means of a new cold-finishing mill, Alcoa has reduced its standard tolerances by as much as .006 in. (plus or minus). It is offering special tolerances that cut leeway by as much as .008 in. (plus or minus).

Airframes Get Benefit — Biggest gainers in this move will be airframe makers, says Alcoa. They provide the largest market for wide sheet and they are penalized the most by sheet deviations. Under ordinary commercial tolerances, plane makers have had to order oversized sheet to make sure minimum thickness specifications were met.

This meant added material costs and added plane weight, says Alcoa. Also, irregularities that go with relatively wide tolerances have meant added processing costs.

Improvements Show Up—Taking a heat-treatable alloy in 288-in. lengths, Alcoa offers this example of the figures involved: A manufacturer who was working to a minimum thickness of .079 in. on an 84-in. sheet had to allow for a commercial tolerance of .011 in. (plus or minus). This meant he had to buy a sheet with a nominal thickness of .090 in.

Under the revised Alcoa list, standard tolerance is .007 in. (plus or minus). A nominal thickness of .086 in. is enough to assure minimum specified thickness at all points. Using this size brings a weight saving of over nine pounds per sheet under the .090-in. thickness. Material cost is down more than $8 a sheet.

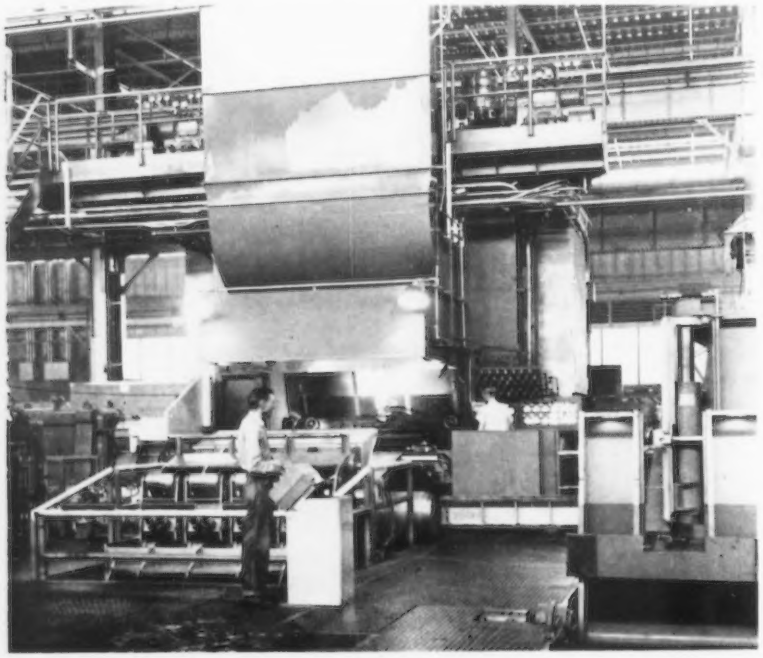
Cost Savings—A further weight saving can be had through use of Alcoa's new special tolerances. And since each extra pound adds $50 to $200 to costs over the life of a plane, Alcoa feels its special tolerances may offer the greatest overall saving.

The company attributes its improved gage control to the hefty new 100-in. mill at its Davenport (Iowa) works. Built by United Engineering & Foundry and costing $4.5 million, the new unit fills a gap for Alcoa between cold mills that finish roll up to 60-in. widths and a 144-in. wide mill that rolls heavier gages.

In the past this gap has been treated as a specialty area by Alcoa.

No Longer a Specialty—By contrast the Davenport mill is a high-speed coil production unit. Heavy backup rolls limit center buildup. Coil handling on the feed side is fully automatic. The mill operates at speeds up to 750 feet a minute.

Net result, says Alcoa, is greater uniformity between sheets and greater uniformity within individual sheets. The last point is important in aircraft applications where sheets are finished by a chemical milling process. This process requires a fairly level surface to start with. With its new sheet, Alcoa says there is no need to level off the crown before the final contouring is started.



ROLLING MILL: Modern, 100-in. cold strip mill is used to finish-roll wide aluminum coiled sheet at Aluminum Co. of America's Davenport, Ia., works, one of the most completely integrated aluminum rolling mills.

THE PROBERS: Dr. Edward Teller, lower right, tells Johnson Committee that the U. S. "waited too long."

Probe Launches Defense Speedup

Senate missile probe will trigger multi-billion-dollar program in advanced weapons development.

Congress could end up giving military a virtual blank-check budget to get things moving.—By N. R. Regeimbal.

▪ First phase of the Senate's intense missile probe is laying the groundwork for a multi-billion-dollar speedup in advanced weapons research and development as well as a boost in some traditional defense programs.

Military and intelligence officials are slowly and carefully easing the curtain of secrecy to permit quick glimpses of Russian striking power and balancing it against our own deterrent strength. The result is a grimness among usually well-informed and not easily awed congressmen.

Cash to Open Throttle—There's almost universal agreement that our technological lags result from a lack of scientific interest and education, wasted effort, duplication, and smugness. Rightly or not, expensive increases in defense spending are being urged as the cure.

Present indications that the Pentagon will need between $1 and $2 billion more in the next fiscal year, plus an extra half-billion for balance of '57 are conservative. To open the throttle on the missile development program these amounts will need to be revised upward.

A budding, though controversial, anti-missile program, if approved would alone cost about $2 billion a year for three years.

Political Overtones—With the first U. S. satellite near firing (it may be in the air when you read this), the politics of the missile speed up practically demand big spending. The Administration knows that if it doesn't cut non-defense spending to the bone, and ask for all the money available within a balanced budget, Democrats in Congress will yell "false economy" and rush to appropriate any surplus. Even if the Administration proposes to spend all the estimated income available, the opposition may well push the budget into the red for next year.

Moves in the Wind—The hearings, being conducted by Sen. Lyndon Johnson, (D., Tex.), and his Senate Preparedness Subcommittee, have focused attention on these probable steps to protect the U. S. while development of missiles and even more advanced weapons is speeded up:

Disperse retaliatory air bases.

Improve detection devices for new types of Red weapons, including their submarines, which intelligence officials say are capable of firing H-Bomb loaded missiles to major U. S. cities from 500 miles at sea.

Raise the pay of government and military scientists and military technicians.

Increase long-range and basic research, including a stepped up program to develop weapons further advanced than the intercontinental guided missile and speed up space exploration.

Devise a system of increasing future supplies of scientists, engineers and technicians, through scholarships, aid to education, or subsidy systems.

All of these plans demand more money than is now being spent.

Farm Machine Picture Brightens

Sales are up, Expected to go Even Higher

After four sinking years, farm machinery makers report 1957 sales have turned upward.

The feeling is 1958 will see further gains.

There's disagreement on extent, but everyone agrees the long-range picture is brighter than it has ever been.—By K. W. Bennett.

▪ Is farm equipment on the road back? An executive vice president of a large farm equipment manufacturing firm says: "There's no doubt about it. We've turned the corner."

Strong words, but there's reason for fresh hope. Industry dollar volume was 11 pct over a year ago at the end of November, and still gaining.

But, cautioned by four lean years, farm equipment producers are building less than they are selling. Tractor production at the beginning of fourth quarter was only .4 pct ahead of a year ago despite the 11 pct manufacturers' sales gain, and retail sales gains that may hit 10-20 pct.

Ring Up Increase—Deere & Co. rang up sales of $380 million at the end of October, up 20 pct from 1956. Oliver's sales were $3 million ahead at the end of the company's third fiscal quarter, and still climbing. J. I. Case reports dealers' sales 20 pct above a year ago. At the end of July the company received a record influx of dealer orders.

International - Harvester shows a $10 million gain for the first three quarters of its fiscal year in tractor sales. In many cases, sales may have been lost due to over-reduced production schedules.

1958 Looks Good — Can farm equipment do it again in '58? Early forecasts suggest a 5-10 pct gain. And these are conservative. Farm net income gained 2.5 pct in 1957 and should hold firm through 1958.

The real sleeper is the long-term market. Farm buying of capital equipment has a potential that forecasters hardly dare believe.

More Farm Capital—Says Allis-Chalmers vice president William Klein: ". . . the amount of capital employed on farms increased from $53.8 billion to $170.2 billion between 1940 and 1956. Capital requirements will continue to increase at about the same rate." This argues for an average annual increase of $7.2 billion in the next decade. Mr. Klein believes that present trends suggest an annual replacement need of 445,000 tractors per year by 1965. This year's production will hit just under half that figure. R. S. Stevenson, Allis-Chalmers president, puts the replacement figure at 450,000 units, but not until 1970.

A sprinkling of farm industry observers argue the figure is too high. A market analyst with a large farm equipment firm disagreed with the Allis-Chalmers appraisal. But he admitted his own forecasts suggest 2.2 tractors per farm in 1970 as compared with little more than one tractor per farm today. Using his own figure, and the expected drop in the number of farms, we'd have 6,200,000 tractors on farms by 1975, a 30-plus pct gain. The Dept. of Agriculture estimates an annual replacement need of 300,000 tractors as early as 1960.

Farm Machinery in Use; What's in Store

Index: 1955 = 100 units in use

Source: Alva W. Phelps, Chairman and President, The Oliver Corp., Chicago

Fewer Farms, More Sales—The Allis-Chalmers figures are, if anything, understated. Tractor output averaged 400,000 units per year from 1949 to 1953. These units will hit the end of their economic life (about 10 years) beginning in 1959.

What about the decline in number of farms? Will fewer farms use less equipment? The reverse is true. Farm acreage has and will remain the same, is the consensus. The decline in total number of farms has come in the $1200-$2599 annual income bracket, hardly a booming equipment market. For instance, between 1940 and 1954, the number of farms in the $10,000 to $25,000 income bracket increased from 46,000 to 449,000. Big farms must mechanize to survive. From 1940 to last year, threshing combines on farms rose from 190,000 to 1 million; corn pickers from 110,000 to 700,000. The value of machinery on farms has risen 450 pct since 1940.

Something Bound to Give — In 1951 and 1952, when farm income hit $32 billion two years running, farm tractor production ran 560,000 and 435,000 units. This year marketing will reach $30 billion and tractor production will reach only half the 1952 figure. One market analyst puts 1957 marketings at $51 billion (in terms of 1957 dollars).

Prophets—Sales forecasters aren't just reading hope into a crystal ball. Here are indications that have already arrived:

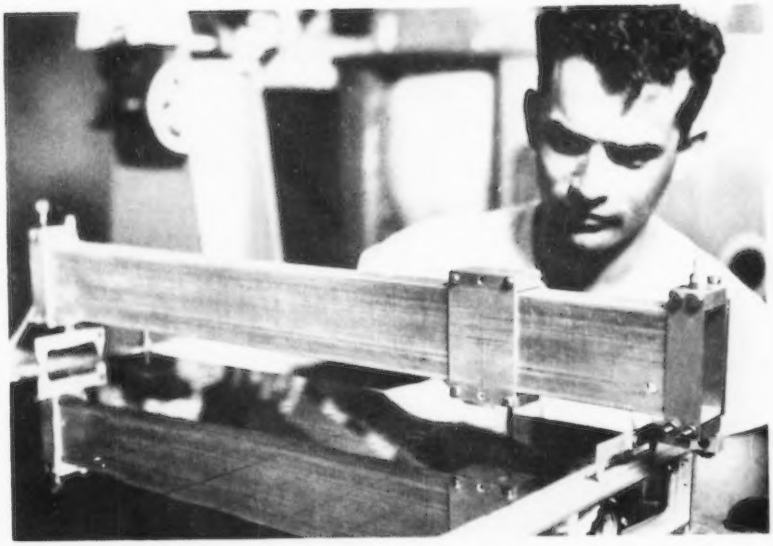
(1) The rapidly growing agricultural Southeast. One large producer reports this already his strongest market, though the Ohio-Iowa belt still takes the bulk.

(2) Rapid mechanization of livestock production, calling for almost automatic livestock feeding, forage production, and forage handling.

(3) Virtual shortages of beef cattle, putting a premium on mass production.

(4) Growth of contract farming, with its guaranteed markets, already here in vegetables, wine grapes, poultry, and pork.

(3) Accelerating land reclamation through irrigation.



FLATNESS CHECK: A sheet of stainless steel is tested for flatness in research laboratories of Princeton University School of Architecture.

Metal Wall Research

■ Metal curtain wall technology has taken a big step forward. It comes in the form of a three-year study completed by Princeton University's School of Architecture.

The study sheds new light on curtain wall costs, the use of stainless steel in curtain walls, design and sealing of joints, and behavior of curtain walls in relation to cooling costs and shading devices. The Princeton research team also developed a reflective method for testing flatness and thermal buckling in metal panels.

Objectivity Cited—The Princeton project is the second sponsored by the Committee of Stainless Steel Producers, American Iron and Steel Institute. It's a follow up of a study completed in 1955.

R. E. Paret, secretary of the AISI committee, pointed out that although sponsored by the stainless steel industry, the study is the indepenedent work of Princeton researchers. It also deals with materials other than stainless steel.

Said R. W. McLaughlin, director of the university's school of architecture: "When our studies began three years ago, it was problematical whether or not this new method of construction would meet with general acceptance. Today the climate of opinion has changed completely."

This is the era of the metal curtain wall, he said.

Examining Costs—An analysis of cost studies for six recent large metal-faced buildings in New York puts wall costs at from $8.73 to $11.24 per sq ft, with an average cost of $9.47.

This apparent cost is lessened even further, the study reveals, by savings in:

1. Cost of structural steel because of the decreased weight of the wall.

2. Cost of foundation and footings.

3. Financing costs through faster construction time.

4. Possible extra revenue throughout life of the building because of thinner walls.

Seals Stressed—According to the study, successful wall construction depends on the design of the joints between its component parts.

Air Conditioners Stalk Industry

They Aim to Make Their Biggest Market Bigger

Air conditioner makers say industrial markets have the biggest untapped potential.

They'll aim their pitches in this direction in 1958.

The key selling points are comfort control and process control.

■ Like the underside of an iceberg, the big market in air conditioning and refrigeration may still be out of sight. Emphasis has been on the smaller but more dramatic residential market. Now the industry is planning to bear down hard on commercial and industrial outlets.

Here's why: Industrial and commercial sales of standard air conditioning equipment hit $557 million last year; and sales this year should about equal '56. Residential sales are off 10 pct from 1956.

Push for Industrial Sales—Carrier, Trane, General Electric, Westinghouse, York, Chrysler, Dunham-Bush, and others, suggest that 1958 will see a more intensive drive on the industrial market.

The commercial market is already poised for a major forward thrust. When 15-20 pct of first class office buildings in a metropolitan area are air conditioned, other office-space owners must follow suit. A number of metropolitan areas in the U. S. have reached this level.

Factory air conditioning is unscratched. Trane estimates less than 2 pct of factory space is air conditioned. There is 50 times more factory space than office space in the nation. The same firm believes that 50 pct of new factory space in the South will be air conditioned over the next 5-10 years.

Many Have a Foothold—There are indications the beginnings of an industrial market breakthrough came in 1957. A heavy valve plant at Houston, the WKM Div. of ACF industries, has ordered a 2225-ton air conditioner. This is big, but it's already dwarfed by a 2500-ton plant for Teletype Corp. to be put in one of its Midwest plants. And an air conditioning granddaddy, a 3250-ton whopper, is scheduled for Martin Co.'s new Orlando, Fla., missile plant.

Plantwide air conditioning is common in precision industries. One television tube maker cut rejects enough to pay for the air conditioning in a little over one year. With all parts at the same temperature in all areas of the plant, under and over-machining rejects plummeted. Norman-Hoffman Bearings Co. went to air conditioning for this reason. Electronics, watch, instrument, and camera makers have followed.

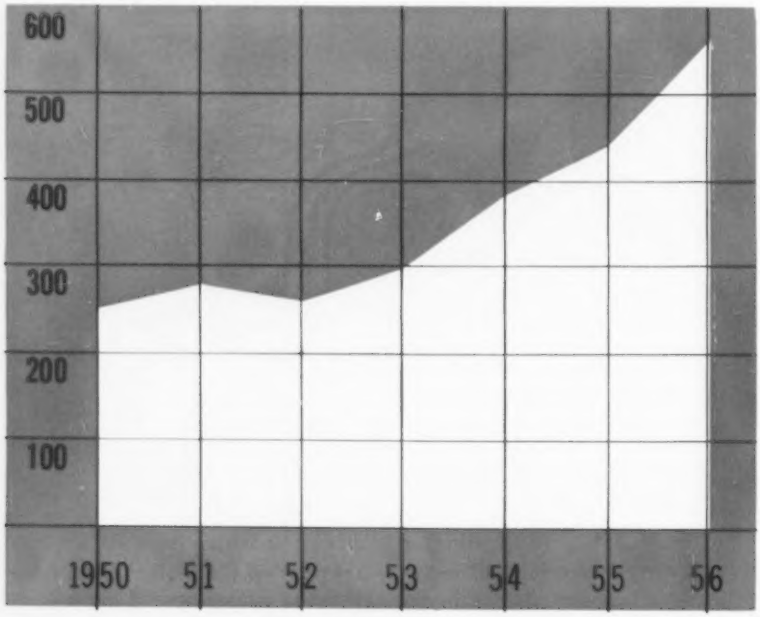
Cheaper For Storage—One firm installed air conditioning and humidity control in storage areas, where high tolerance parts inventories were kept for long periods. It is cheaper than coating the parts and then cleaning them before use.

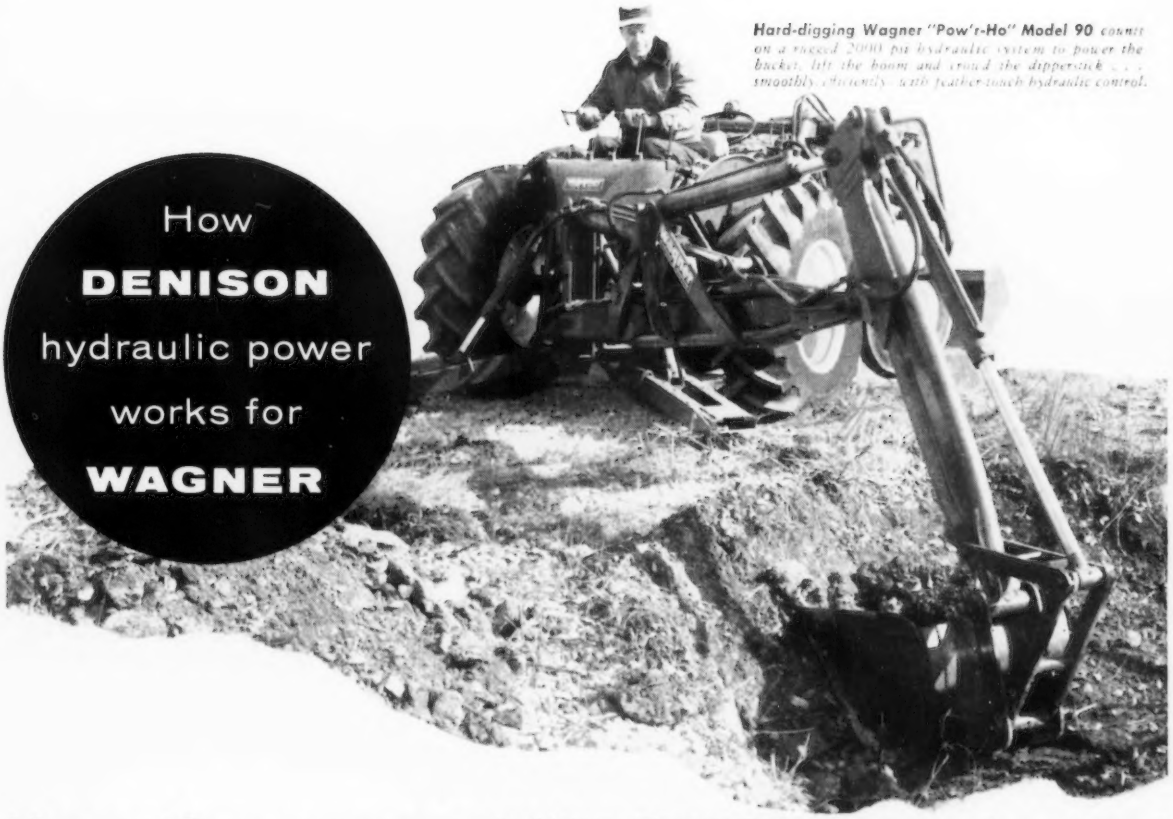
Another chose air conditioning to eliminate dangerous fumes from plant work areas. Unexpected payoff was that fresher air kept machine operators alert, reduced the number of accidents.

A plant operator was sold when it was shown that, with air conditioning, he could eliminate windows in his new plant. This reduced heat loss, which cut heating equipment costs and fuel costs. His air conditioning paid for itself, for none of the reasons usually given.

Air Conditioning Markets Expand

Sales in millions of dollars of central station air conditioning and process refrigeration equipment. Source: Air Conditioning and Refrigeration Institute.





Hard-digging Wagner "Pow'r-Ho" Model 90 *counts on a rugged 2000 psi hydraulic system to power the bucket, lift the boom and crowd the dipperstick . . . smoothly, efficiently, with feather-touch hydraulic control.*

How **DENISON** hydraulic power works for **WAGNER**

How the rugged WAGNER "Pow'r-Ho" bites 12-feet deep

. . . another application for DENISON hydraulic power

Hydraulic Punch *for the "Pow'r-Ho" is supplied by a single Denison 2000 psi TMC balanced-vane pump that actuates five hydraulic cylinders.*

Whatever the job—digging gas line . . . foundations . . . or drainage ditches—the rugged Wagner "Pow'r-Ho" Model 90 backhoe bites in hard, fast and deep with hydraulic muscle-power by Denison.

Five hydraulic cylinders—actuated by a Denison hydraulically-balanced TMC vane-type pump—power the bucket . . . lift and swing the boom . . . crowd the dipperstick. It's a fast, smooth, efficient operation—with power to spare, because a rugged, Wagner-designed 2000 psi hydraulic system and the Denison TMC vane pump make it that way.

Result: Harder digging with faster time cycles that mean *more profit* to the user.

It's the kind of job your Denison hydraulic specialist can help *you* do. Ask him more about how Denison 2000 psi pumps can improve the performance of *your* equipment. Write Denison Engineering Division, American Brake Shoe Co., 1242 Dublin Road, Columbus 16, Ohio.

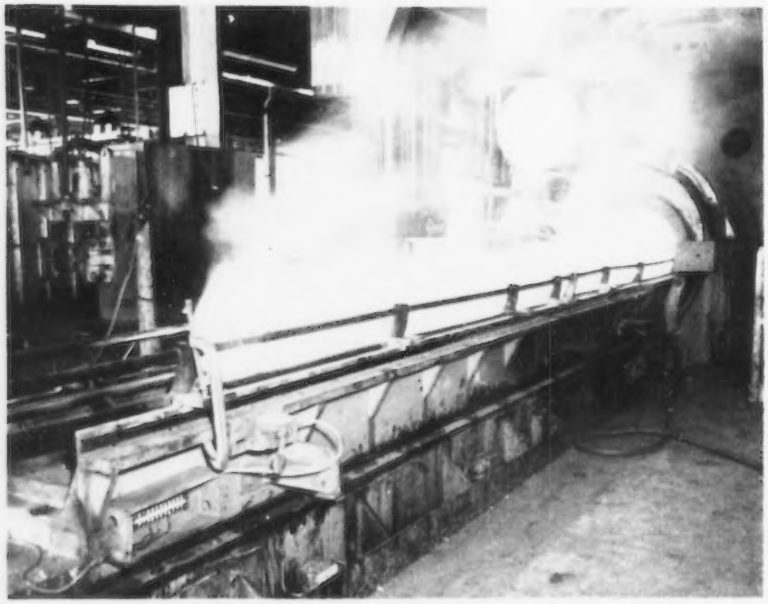
DESIGNERS—ENGINEERS! Write for your copy of Bulletin 201—"How to Design More Efficient Hydraulic Power Into Mobile Machinery".

Denison and Denison HydrOILics are registered trademarks of Denison Eng. Div., ABSCO

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

DENISON HydrOILics

King-Sized Steel Extrusion Press



TO BE TUBE: A 12,000-ton horizontal steel extrusion press is called world's largest by its owner, Metal Process Div., Curtiss-Wright Corp. It turns out seamless tubing of stainless and chrome moly steel, in lengths to 60 ft, O.D. to 20 in., virtually any wall thickness.

Oil Country Record

Shipments of finished steel products to the oil and gas industry in 1957 may set a new record, says the American Iron and Steel Institute.

Prospects are good that shipments may hit seven million tons. The standing record is 5.6 million tons, shipped in 1956.

The big items are oil country goods and line pipe. Shipments this year have been at the rate of three million tons. In the record year, 2.6 million tons of tubular steel were shipped.

The annual rate of linepipe shipments in 1957 has been nearly 4.5 million tons. This should top the 3.7 million tons shipped in 1956.

Canada Studies Change In Steel Tariffs

Canada is considering tariff revisions on some steel imports. Under current proposals the duty on some items would be lowered, on others hiked. The overall average will be lower. The Canadian government is now seeking agreement from members of the General Agreement on Tariffs and Trades.

The decision to study tariff changes stems from the Canadian Tariff Board. A spokesman of the Canadian steel industry, active in the project, said present tariffs on some steel products haven't been changed since 1907, and now are dated.

These May Change — Items on which tariff changes will be negotiated include ingots, structural steel, pipe and tubing.

Loan for Indian Steel

Tata Iron & Steel Co., largest steel producer in India, will get a $32.5 million loan jointly from the World Bank and nine U. S. and Canadian commercial banks.

The money will complete an expansion program aimed at doubling Tata's ingot capacity to two million tons annually.

The total investment, by March 1960, will be about $250 million. More than half of this will be foreign capital. The $15 million provided by the U. S. and Canadian banks in the latest loan is the largest private participation ever in a World Bank loan.

The main installations to be completed are a new battery of coke ovens, an ore crushing and sintering plant, a blast furnace, increased converter and openhearth capacity, a blooming mill, a continuous sheet, bar and billet mill, and a structural mill.

Indian production costs for steel are among the lowest in the world, because of the convenient location of abundant coal and iron ore.

Device Converts Heat Into Electricity

The thermionic converter goes the solar battery one better. Without falling back on the use of moving parts, it will convert heat directly into energy.

It is the brainchild of Dr. Volney C. Wilson, General Electric Research Laboratory, Schenectady, N. Y.

It's Basic Research—Dr. Wilson points out that his device is not a commercial product. It will be used for further research on simple ways of converting heat into electricity.

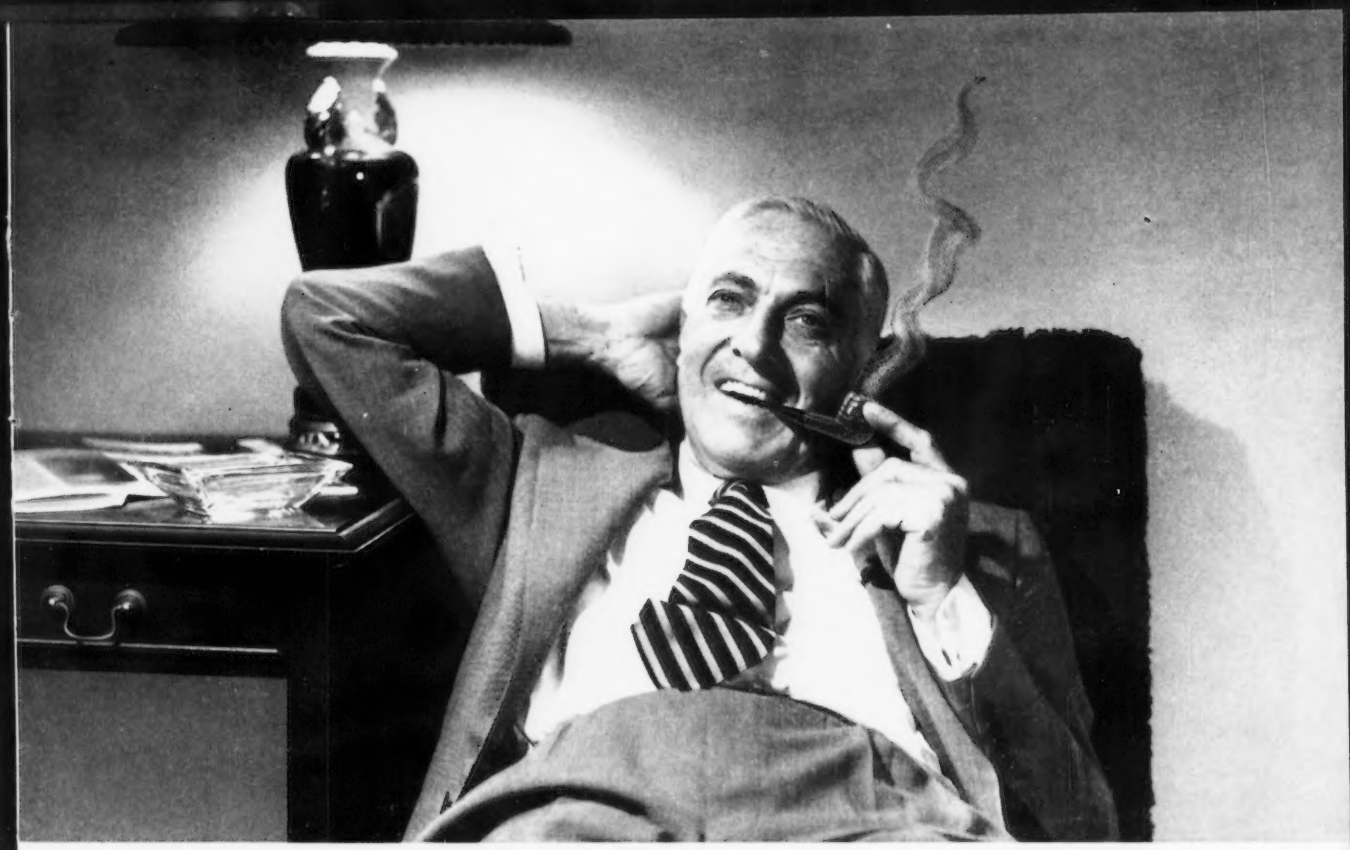
The current model can change more than 8 pct of the applied heat into electric power. It is considered possible by GE that future models will convert up to 30 pct of applied heat to power.

How It Works—The thermionic converter contains two electrodes, maintained at high but different temperatures, in a tube-like device. A gas smooths the flow of electrons from the hotter electrode to the cooler.

Zirconium Contract

Firth Sterling Inc. has been awarded a $1.5 million contract by Westinghouse Electric Co. for melting of zirconium ingots from sponge and conversion into finished products.

This is the first integrated contract let to a single company.



How to Relax

If you're all tied up in knots over the high cost of operations, there's an easy way for you to break the tension. Put CIMCOOL® to work in your plant and dreams of increased production and lower costs will become realities. You'll relax with the knowledge that CIMCOOL Concentrate is taking care of your cutting fluid problems. Here's why:

- **CIMCOOL LOWERS COSTS** because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.
- **CIMCOOL DOES A BETTER JOB** because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.
- **CIMCOOL IS CLEAN,** doesn't soil clothing or hands. It contains no skin irritants. It leaves no slippery film on shoes, floors, machines or work. It can't burn, and virtually eliminates rancidity and foul odors.

There's no need to send up smoke signals. Simply phone your CIMCOOL Distributor. He'll give you complete information on CIMCOOL Concentrate—and the entire family of CIMCOOL Cutting Fluids.

Or contact us direct. We'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

®Trade Mark Reg. U.S. Pat. Off.

CIMCOOL CUTTING FLUIDS

CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT **Concentrates** — For jobs requiring oil-base cutting fluids. Added to mineral oils, they give economical mixes for higher speeds and feeds.

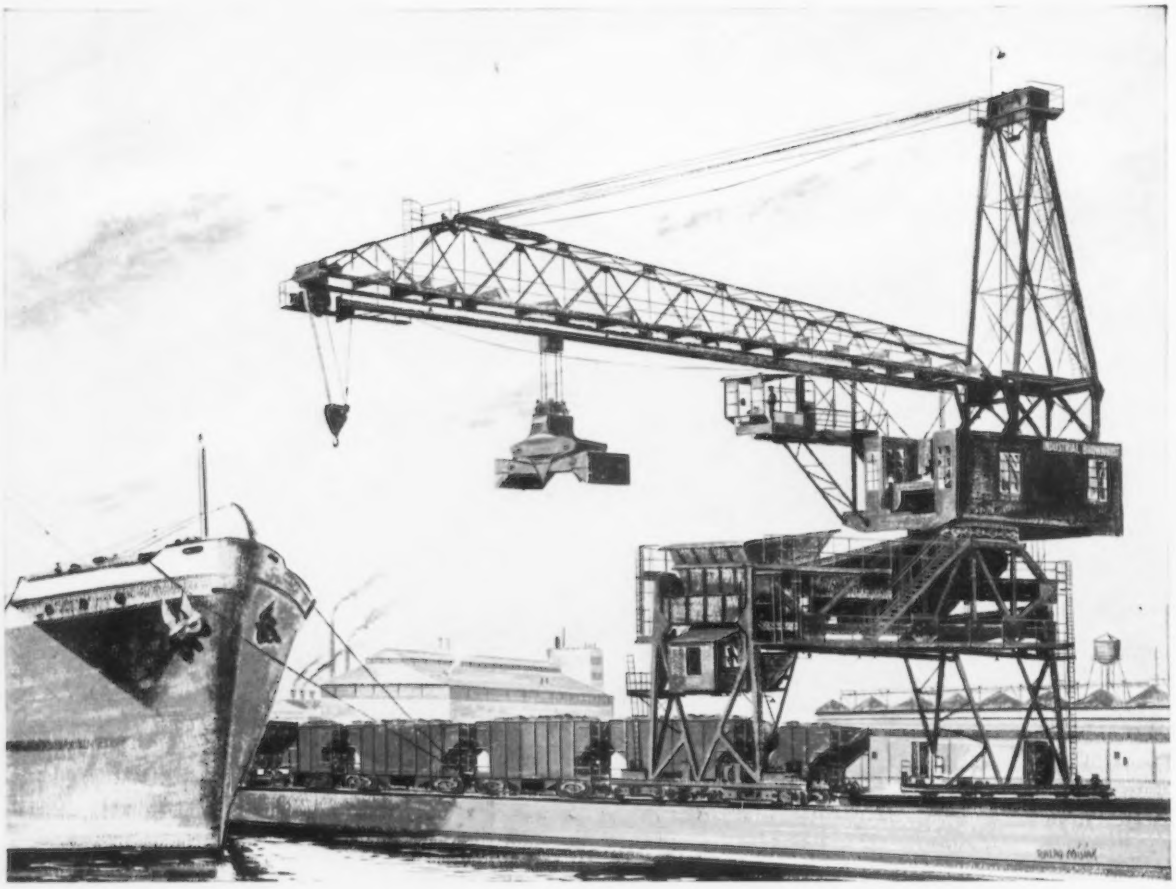
CIMCOOL **Bactericide** — The most effective agent yet developed to overcome rancidity and foul odors.

CIMCOOL **Machine Cleaner** — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.



how 75 ton BROWNHOIST combination crane will greatly increase GALVESTON port facilities

The latest type combination boat-unloading crane being engineered and built by Industrial Brownhoist in Bay City, Michigan will substantially improve facilities in the Port of Galveston's 1957 expansion program.

This big, fast-working Brownhoist crane loads or unloads bulk materials from ship-to-cars or cars-to-ship at the remarkable rate of 540 tons per hour! Equipped with 75 foot boom, on which travel both a hook and a Brownhoist-made, 80 cubic foot flush link-type bucket. The entire unit straddles three railroad car tracks located on the pier.

In addition to boat unloading equipment and material handling bridges, Industrial Brownhoist manufactures Diesel-Electric locomotive cranes from 25 to 90 tons, and railroad cranes up to 250 ton capacities. If your firm can profit from reliable, high-speed, high-capacity material-handling equipment, write for new general Catalog No. 562.

201

BROWNHOIST

CLAMSHELL BUCKET

CRANE

CAR DUMPER

LOCOMOTIVE CRANE

INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, San Francisco, Montreal, Canada • AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF Penn-Texas CORPORATION

Thomas Z. Hayward

A One-for-All Approach to Sales

This executive goes beyond the job classification codes for his salesmen.

No one in his company is too big or too small to contribute to the total marketing effort.

▪ From Thomas Z. Hayward's point of view, even your janitor is a sales representative for your company. Mr. Hayward, who is vice president-sales, of Joseph T. Ryerson & Son, Inc., looks at everyone in his firm as a potential order-getter.

He made a business credo out of the slogan: "The sales department is not the whole company, but the whole company is the sales department."

Calling the Signals — "All our people are sales minded," he explains. "Each person knows how his job affects our relations with customers. Consequently, everyone does his bit to uphold our company's reputation for quality performance, whether the task be that of adding a column of figures or pulling stock from a rack."

Keeping a large steel marketing organization in top operating condition depends on teamwork, he says. And because Tom Hayward has the knack of getting to the heart of a problem quickly and then coming up with the right answer, he has won the support of employees in carrying out his program.

Hard Work and Talent—Having pounded the pavement himself for 11 years before moving up into management, Mr. Hayward knows the kind of support a salesman needs from the home office. About a third of his time is spent away from his office, at Ryerson plants throughout the country.

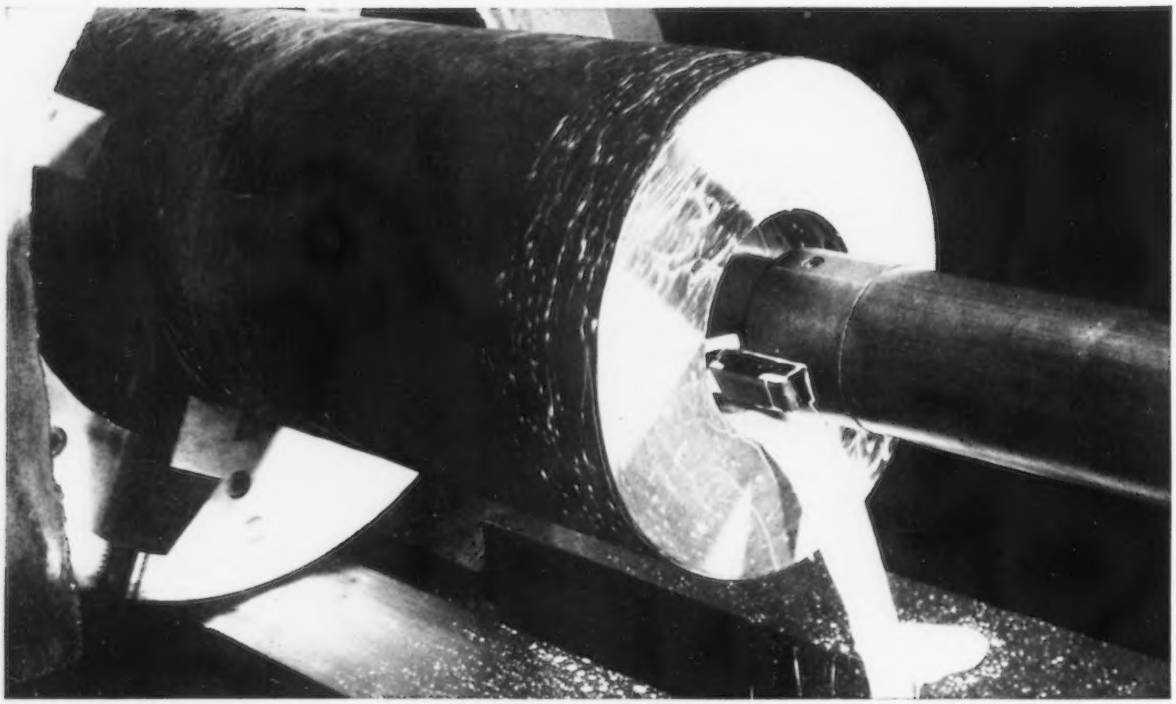
THOMAS Z. HAYWARD: Everybody is a salesman.

He generates a contagious energy, his associates say — the kind that re-charges a salesman who is down in the dumps. Every worker is made to feel that he or she is a key member of the company team and that "sparkling team play rather than individual performance is the answer to increased sales and company growth."

Mr. Hayward's climb to the vice presidency of Ryerson followed a familiar pattern. He started in the mailing room at the firm's Chicago plant in 1917, worked his way up to his present job by 1951. He is also a Ryerson director and member of the executive committee.

A Promoter—Outside the office, Mr. Hayward is one of the top promoters for the Steel Warehouse Assn. He travels extensively, cultivating a better understanding of the function of the steel distributor.

Some of his contagious energy has rubbed off on Barrington, Ill. community life. A member of the board of education there for 11 years, he played an important part in getting a new high school for the district. He was also awarded a certificate of merit by Northwestern University for his many years service on the alumni advisory council on athletics.



Finish boring is your first step with Timken® seamless steel tubing —the hole's already there!

YOU save time and money when you make hollow parts with Timken® seamless steel tubing instead of bar stock. You eliminate drilling because the hole's already there. Finish boring is your first production step. With less metal to machine away you get more parts per ton of steel.

And because Timken seamless steel tubing eliminates one boring operation, your screw machine stations are free for other jobs. You get more machining capacity without adding machines.

And you get a better quality finished product with Timken seamless steel tubing because of the way we make it. A solid round is forged over a mandrel, thoroughly working the metal inside and out. This rotary piercing operation gives Timken seamless steel tubing its fine forged quality, uniform spiral grain flow. With exacting control of temperature and piercing speed, we maintain this quality from tube to tube, heat to heat, order to order.

And to further increase your steel savings, Timken Company engineers will be glad to recommend the most economical tube size for your hollow parts job. You'll get a size guaranteed to clean up to your dimensions. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

TIMKEN *Fine Alloy* STEEL

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

Upturn May Be Only 90 Days Off

You don't have to be an economist to see that the general downtrend will continue through the rest of 1957.

But the economic facts of life rule out a serious recession next year.

The current decline may have run its course in not much longer than 90 days.

▪ Business is still in a mild state of fright. Incoming orders in most individual businesses are down and anyone who takes the trouble to look at them will see a depressing set of economic indicators.

These same indicators will no doubt look worse before they get better. After all, most sets of statistics are just rounding out October. It doesn't take much foresight to see that November figures will look worse.

Year End Downtrend—This will put business in the position of going into the New Year with little to cheer in a series of graphs all on the downtrend.

It's little consolation for the average businessman to realize that income for the entire year will be substantially over 1956 as long as the trend in late 1957 continues down.

Three of the most significant gages of business, personal income, employment, and retail sales, are all down. Spending for capital goods is falling off, machine tool orders are at a 7-year low (see p. 117), orders for fabricated structural steel are down, to name a few.

Upturn Soon—But it looks better farther into the new year. In fact, some experts forecast an end to the current sag within 90 days. In any case, a full scale recession in 1958 is out. Here's why:

Government Spending—Defense expenditures will go up about $2 billion. This means new contracts, stepped-up production in some areas, increased payrolls, and higher purchasing power.

Money — Bank and commercial interest rates are softening. This means it will be easier and less costly to obtain financing for plant expansion, new homes, other consumer goods.

Dollars will be more plentiful, with some "cheapening" of the money supply. Inflation will tend to come to life again.

Income—Wages will rise. Despite talk of unemployment, wages will climb in 1958. Unions are determined to win new wage increases, new worker benefits. Retail workers stand a good chance of being brought under the Federal wage-hour law, which will add millions to payrolls, nationwide.

Farm income will tend to nudge upward. Consumer spending for agricultural products will stay high and prices will tend to go higher.

Climate Cool to Tariff Hikes

Cool Reception—Industries that are seeking tariff protection in any manner will find the climate in Washington a lot more frigid.

There may be individual exceptions, of course, but the Administration is not inclined to look favorably on programs that will hurt in the slightest our relations with our allies.

Particularly with the key NATO talks coming up, the Administration is not likely to let anything through that will hinder trade with European countries.

President's Feeling — All of the comments relative to the establishment of a Trade Policy Committee by the President indicate that the current attitude is to promote foreign trade, not restrict it. In issuing the executive order, the President called the reciprocal-trade programs one of our most important programs in the field of foreign economic policy.

Since Sputnik, the intent has been firmly established to do everything possible to strengthen relations with all free nations. In this climate, it will be much more difficult to win tariff protection.

Line 6(a)— Out Again, In Again

In case you were worried about line 6 (a) in the individual income tax return for 1957, you will be relieved to see you will not have to answer the line after all.

This was the line, inserted this year, which required totalling, and itemizing on attached sheet, all reimbursed expenses.

But, the IRS warns: "For the year 1958, all individual taxpayers who incur expenses . . . should keep adequate records . . . so that for 1958 and later years they will be in a position to supply expense account information from their own personal records."

AUTOMOTIVE

Labor Unrest Spreads in Detroit

Trouble Centers on New Production Standards

A rash of strikes in the Motor City is only the beginning of a long, hectic winter.

Chrysler Corp. will probably be hardest hit at the bargaining table.—By H. R. Neal.

■ In recent weeks, the busiest people in the automobile industry have been the labor relations and union representatives. After a comparatively peaceful summer, the Big Three auto companies have been hit by a rash of strikes and strike threats.

General Motors recently settled a 33-day strike at its Detroit Transmission plant—and just in time, too. Some 6200 striking employees would have forced layoffs for thousands more workers in other plants if the strike had continued much longer. Buick narrowly missed a strike by making peace with 21,000 workers at its Flint, Mich., plant.

Backlog of Trouble— A strike began in early November at Ford Motor Co.'s Louisville assembly plant, idling 4200. It ended only after 20 days of lost production. In addition, 5000 Lincoln and Mercury employees stand poised to troop out of the Wayne, Mich., plant if pending negotiations aren't fruitful.

But Chrysler Corp. has the largest backlog of trouble on its hands. Two weeks ago an uneasy peace was achieved with 17,000 stamping division employees. Settlement came after a prolonged negotiating session saw a union walkout order postponed at the last minute.

Chain Reaction—Negotiators just about had time to change shirts when they hopped across town to join talks at Chrysler's Plymouth engine plant. They arrived too late. A walkout of 2200 employees went off as scheduled. Company and union negotiators now have added pressures, knowing the strike could quickly force shut-downs of Plymouth assembly plants in Detroit, Newark, Del., Evansville, Ind., and Los Angeles. This would put an additional 23,000 workers out of work. But settlement of this strike doesn't clear the air.

Employees at Chrysler's Dodge Main plant here have indicated a willingness to take time off while company and union negotiators solve some of their problems. De Soto workers have expressed a similar willingness. And the Highland Park, Mich., parts manufacturing plant has had a strike threat hanging on the gate posts.

One Major Complaint—Is this an indication of general unrest among the rank and file members of the United Auto Workers? Or is it a harassing maneuver on the part of

Talking About Aluminum in Autos

THREE VICE PRESIDENTS: Earl G. Ward, Ford Motor Co.; John J. Cronin, General Motors; and Donovan Wilmot, Aluminum Co. of America, confer before testifying at the Yates subcommittee of House Small Business Committee hearings. The automakers affirmed their confidence in aluminum, will use more in future cars. Aluminum people indicated they would be able to meet the boost in demand. All agreed the small aluminum fabricators would land a bigger share of this market.

ECONOMIC FACTS ON FASTENERS

COLD HEADING: A WAY TO CUT UNIT COSTS

- **Eliminates extra operations; faster than forging**
- **Metal flows to shape — without waste, without machining costs**

Here's a manufacturing fact often overlooked: The same machines that spill out large volumes of standard fasteners at surprisingly low cost can also produce *special* mechanical parts . . . also in volume and also at low cost.

It's surprising what an *expert* can do with cold heading machines. Some parts that would otherwise be two or more pieces are turned out as uniform, integral units. Parts that would otherwise require slower, costlier machining spout from the cold header with little or no scrap loss. What's more, the pieces are stronger.

Case Histories: (1) Eliminating double forging operation, high speed cold heading machine cuts and bends lengths from continuous rod to form shifter lever. It also gives greater strength, improved finish, closer tolerances. (2) Instead of a machined screw assembled with separate stamped screw driver shield, hose clamp screw is now cold headed in one piece. (3) No longer cut on screw machine, insert screw for plastics costs 40% less. Cold header uses just amount of metal required.

Call on the RB&W Fastener Man. He can tell you whether or not cold heading is feasible for producing your screw machine parts, forgings and small assemblies. If so, RB&W facilities can handle your volume needs. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

R B&W
112th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

Spin-Lock Screws Eliminate Washers

Ratchet action teeth on Spin-Lock Screws bite into the seat of any surface the screw is driven into. Their tight hold requires about 20 per cent more torque to loosen than to tighten. With this strong grip, separate washers or other locking devices are unnecessary. One-piece Spin-Lock construction gives faster assembly, lowers inventory needs—and affords fasteners that will stay tight in products subjected to vibration or repeated heating and cooling. Send for bulletin.

12-point fasteners cut wrench clearance space

Double hex RB&W bolts and nuts measure smaller across their points than single hex fasteners. Used with an external socket wrench, they permit optimum driving torque to be applied.

Thus, while fitting cramped spaces in compact assemblies, these fasteners also assure proper preloading for *stronger* connections.

Available with plain flange, or SPIN-LOCK design.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY

First with NEW "Automatic" Service

Cone was the first builder of multiple spindle automatics to provide machine users with an experimental service in the application of carbide tools.

This service is a practical means of determining the possibilities of carbide tools for production men without loss or interference with their regular production schedules.

A pamphlet "FOUR STEPS WITH CONE" describes this service. Send for your free copy.

Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.

Automotive Production

WEEK ENDING	CARS	TRUCKS
Nov. 30, 1957	121,404	16,977
Nov. 23, 1957	151,846	23,604
Dec. 1, 1956	159,976	25,062
Nov. 24, 1956	118,949	17,296
TO DATE 1957	5,591,000	993,500
TO DATE 1956	5,204,638	1,109,890

*Preliminary Source: Ward's Reports

the union to soften the automakers for the big blow next spring?

One characteristic has been common to just about each of these labor problems—whether at Ford, GM, or Chrysler. They all center on production standards.

There are several reasons why disputes over production standards occur at this time. New models mean new methods, new operations and parts, and new production standards. It takes a few months for new standards to go through grievance procedures before emerging as higher level issues.

The Union's Position—But Chrysler's problems are more deep-rooted than the annual model change. Even in effecting a settlement, the issues are seldom solved on a more than temporary basis. This is evidenced in a statement issued after the stamping division settlement by Norman Matthews, director of the UAW's Chrysler Dept., and other key members of the union negotiating team:

"Although we have arrived at an agreement on pending production standards disputes, the union is not satisfied with the company's attitude, position, and policies in its attempts to impose increased production standards in Chrysler." This explains the union position in a nutshell.

Management Position — In a statement issued at the start of the Plymouth Engine strike, Chrysler charged: "This unnecessary strike has been called by the union over its demands for work standards far out of line with those prevailing elsewhere in the industry, and its insistence upon the hiring of an excessive number of employees in addition to those already employed at the Mound Road Engine plant." And this pretty well sums up Chrysler's position.

What is happening at Chrysler can and has happened to other firms, even in this day of enlightened labor relations. It happened to American Motors Corp. and to Studebaker-Packard. Both found it costly in the long run, if not nearly fatal.

Simply stated, the management bought "peace at a price" over the years. It made concessions to labor while its competitors took strikes. Now, in order to regain lost ground, Chrysler must take the strikes—or at least face the threats of strikes. A company always finds it tougher to rescind concessions.

Roots of Dissension—Union local politics plays a big part in keeping the workers stirred up. Union officials, from stewards on up, are elected. They keep the jobs only as long as they retain the favor of the voters.

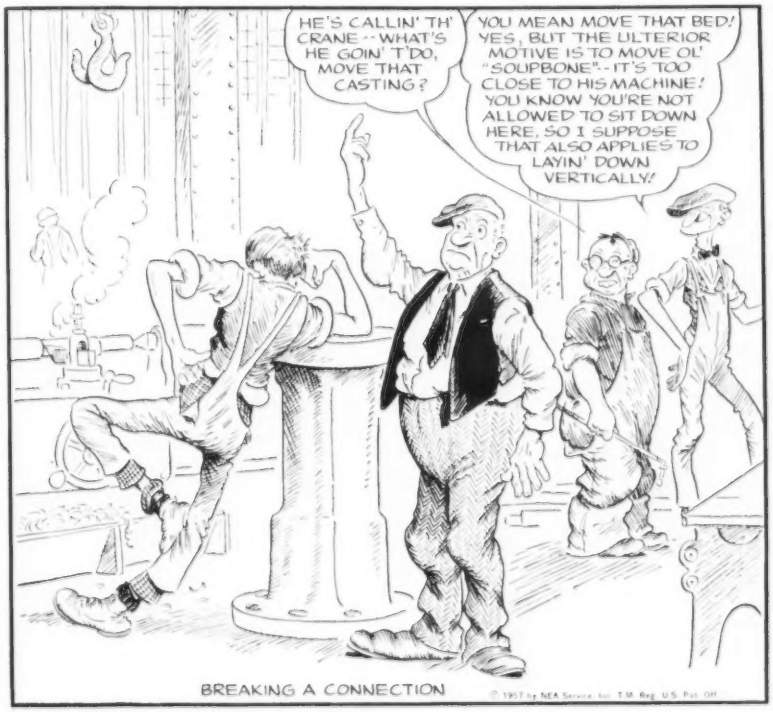
While it's unlikely an International UAW vice president would be overthrown in a single election, it isn't the case on the local level. There, discontent starts with the man on the line and rapidly works upward. Local officials pay heed, or else. Higher officials can be expected to follow suit.

For example, an employee has spent 10 years at a machine contentedly turning out 100 pieces an hour. The foreman comes along and tells him the new standard is 150 pieces. If he went to a plant across the street, where the production standard was 150 pieces an hour, he'd produce without giving it a thought. But at his present job? Never! And he'll never hear his steward tell him the new standard is fair and to produce and shut-up. As soon as this occurs, the man at the next machine would tell him "Vote for me at the next election and this won't happen."

Clashes Coming—Union officials in Chrysler plant locals have established strong domains by keeping an ear tuned to the workers' gripes—reasonable or otherwise.

In its move to tighten production standards, Chrysler is finding the pleasures of a peaceful yesterday were bought at a high price.

THE BULL OF THE WOODS



SAFETY SWITCHES STAND UP UNDER 100,000 AMPERE SHORT CIRCUIT TEST!

INDEPENDENT TESTING LAB RELEASES FINDINGS AFTER GRUELLING "TORTURE RACK" TESTS

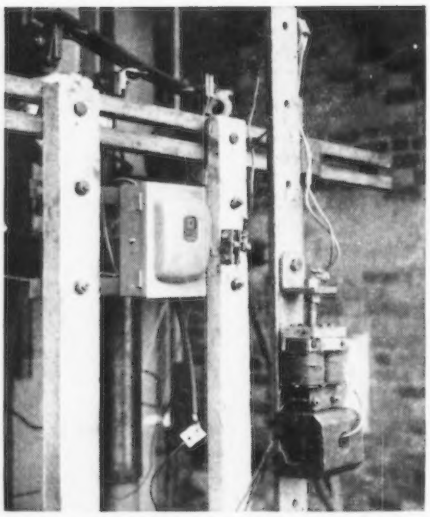
Unprecedented tests have been completed on 30 through 600 ampere rated Square D safety switches equipped with high capacity current limiting fuses. During these tests, switches were closed on a short circuit system delivering up to 100,000 amperes (symmetrical R.M.S.). In addition, the fault was applied on the closed switches. *All switches withstood the shocks without any sign of failure!*

High Capacity Systems Demand Stamina

High capacity systems capable of delivering tremendous short circuits are becoming more and more prevalent with the growth of electrical loads. Network systems in metropolitan areas are a source of such faults. Another, the heavy industrial areas, with a concentration of sub-stations and rotating machinery. Terrific stresses and heat generated by such faults are serious hazards to both personnel and equipment unless properly contained. That is why proven protection for switching service and feeder circuits is of major concern.

Square D Standard Switches Do The Job

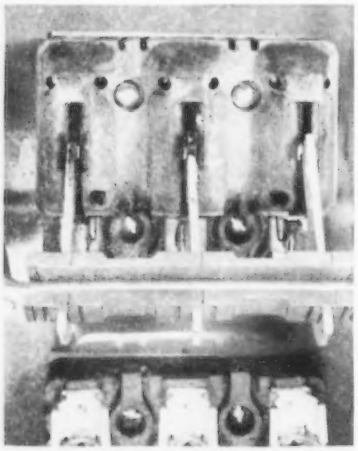
These tests offer conclusive proof that standard Square D Type HD and Type ND switches, equipped with high capacity current limiting fuses, can be used on such systems without fear of failure. You pay no premium for the proven performance they offer. Why settle for less?



Square D switch on "torture rack" during test involving up to 100,000 ampere short circuit

SUMMARY TABLE • Extract from Report No. S/NA R66—Sheet No. 5

Ampere Rating	Voltage Rating	Catalog Number	Average Symmetrical Prospective Current R.M.S.	Recovery Voltage R.M.S.	Maximum Total Arcing Time	Fuse Type
30	250	A85351	96,600	252	.0009	A2Y-30A
30	250	A85351	96,400	253	.0010	FRN-30A
30	600	A85341	107,000	590	.0020	A6Y-30A
30	600	A85341	106,000	601	.0027	FRS-30A
60	250	A86352	96,400	248	.0010	A2Y-60A
60	250	A86352	95,200	252	.0019	FRN-60A
60	600	A86342	106,000	605	.0011	A6Y-60A
60	600	A86342	108,000	598	.0020	FRS-60A
60	600	A86342	107,000	601	.0013	NAS-60A
100	250	A86353	95,200	253	.0009	A2Y-100A
100	600	A86343	108,000	604	.0014	A6Y-100A
200	250	A86354	95,200	253	.0037	A2Y-200A
200	600	A86344	107,000	602	.0011	A6Y-200A
400	250	A86355	95,900	252	.0039	A2Y-400A
400	600	A86345	106,000	611	.0050	A6Y-400A
600	250	A86356	94,500	251	.0062	A2Y-600A
600	600	A86346	107,000	601	.0062	A6Y-600A



Above • Extract of Nelson High Power Laboratory Report C/NA-66

At left • No sign of failure in this switch interior after 100,000 ampere short circuit test

SQUARE D SAFETY SWITCHES GIVE YOU *Certified* PERFORMANCE!

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Standby Controls in Works Again

Some Businessmen Quietly Promote Them

There are logical reasons for having standby controls on the books in case of emergency.

A surprising number of businessmen who are generally opposed to controls now push them.—By G. H. Baker.

▪ A lively battle over price controls is in the making. The Eisenhower Administration and some congressmen (both Democrats and Republicans) believe the Federal government should be armed with standby authority to control prices. Other congressmen are firmly opposed. They point to the soft market conditions that exist in many lines.

Sen. Homer Capehart, ranking Republican on the control-writing Senate Banking Committee, is the leading Republican spokesman for authorizing the Administration to set up a price-control program. He says such a law is necessary now because a future emergency will arise so quickly the Congress won't have time to write a control measure after disaster strikes.

Arguments Against — Capehart is probably correct in this assumption. But those who oppose a price-control law say: (1) A standby price-control law creates higher prices. (Fearful of being stuck with low prices when the price freeze hits, companies tend to charge all the traffic will bear); (2) The next world war will be so totally disastrous there won't be any normal channels of business or any prices left to control, nor any government agency to police the prices.

Truth is, most business firms didn't suffer under price controls as they were applied during World War II and again in the Korean War. Despite all the bleating about "hardships," most manufacturers and retailers reaped handsome profits during both of these periods of price control.

Urged by Some Retailers—Many retail merchants today will tell you they "never had it so good" as they did in times of price control. Because of artificial shortages of such items as automobiles, men's shirts, and nylon hose (government production orders banned manufacture), customers fought for the privilege of paying sky-high prices for merchandise. These same merchants are today quietly urging a "bring back price controls" campaign, for they fondly hope to relive the brisk merchandising days of 1942-1946, and 1950, 1952.

But the weakness of this happy dream is that history may not repeat itself.

Investment Trust Plan Pushed

Joint government-private investment trusts to provide funds for small firms are being suggested by leading stock market experts as a possible method of easing the plight of small business.

Under the plan, the government would become direct investors in small manufacturing plants, stores, and other firms through trusts jointly financed by Federal and private capital. Such investment trusts won't catch on, these experts say, until the Federal government becomes a partner and contributes "in some way to the losses that are there."

Sputnick Scores Hit—On Secrecy

Tough Target—Russia's ballistic missile has already scored one direct hit in this country. First U. S. casualty of the missile age is a badly-damaged government secrecy program that has withstood other assaults for more than a hundred years.

As a result of the sputnik uproar and a head-busting congressional investigation, the Defense Department now is getting ready to take the secrecy wraps off military documents dating back to the American Revolutionary War. Secret documents relating to George Washington and his Continental Army, to the War of 1812, the Mexican War, the Civil War and the Spanish-American War, as well as World Wars I and II, are due to be released.

Custer First Out—First of the literally millions of documents now housed in 100,000 file drawers to see the light of day are secret papers relating to General Custer's conduct just before the massacre in 1876.

More important outcome of the present anti-secrecy campaign being led by Rep. John E. Moss, D., Calif., is concentrated pressure for easing secrecy barriers between scientists in and out of the military to speed up this country's research program.

Demand Positive Identification

when buying HIGH-STRENGTH STRUCTURAL BOLTS AND NUTS

LAMSON High-Strength Bolts and Nuts

1 LOOK FOR THESE SYMBOLS ON THE HEAD

The three radial marks and the "A-325" indicate that the bolts meet the latest ASTM specifications for High-Strength Structural Bolts. The "L" on the head identifies the bolt as manufactured and *guaranteed* by LAMSON & SESSIONS.

2 LOOK FOR THE NUBS ON THE WASHERS

The nubs on the washers show that they have met the specifications laid down by ASTM.

Look for the three nubs on the perimeter of the washers you buy . . . and be *sure* of ASTM quality.

3 LOOK FOR THE ARCS ON THE NUT

The three long indented arcs on each end of the nut indicate that it meets with the latest ASTM specifications.

The three short dashes between the arcs are a Lamson & Sessions trademark . . . your assurance that you are getting Lamson *proven quality*.

Play *safe* and *sure!* Specify Lamson & Sessions High-Strength Bolts and Nuts *every time* you buy.

ORDER YOUR LAMSON HIGH-STRENGTH STRUCTURAL BOLTS FROM YOUR INDUSTRIAL DISTRIBUTOR

West Plans for Steel Upsurge

Sharp Gain Expected in Warehouse Sales

Leslie Worthington, Columbia-Geneva president, is optimistic about steel consumption in Far-West in next five years.

He looks for a 35 pct increase in warehouse sales and a substantial gain in sheet and bar use.—By R. R. Kay.

■ There'll be a 35 pct hike in steel warehouse sales in the 11 Western States within the next five years. At least that's how it looks to Leslie B. Worthington, president, Columbia-Geneva Div. of U. S. Steel.

And for 1960 to 1965 Mr. Worthington thinks warehousemen will sell 400,000 tons per year more than they did in 1956.

Up 50 to 100 Pct—During the same period he sees Western consumption of cold rolled sheet up almost 100 pct, hot rolled bars up 60 pct, and hot rolled sheets up 50 pct.

Speaking before the Western regional meeting of the American Steel Warehouse Assn., Mr. Worthington pointed out: "This provides a real basis for long-range optimism. Admittedly, it may be a little difficult to be optimistic under today's conditions. With our market somewhat depressed and fourth quarter activity in the steel industry not living up to earlier expectations, there is a natural tendency to become concerned."

Current Slump Temporary—But he predicts that the current state of the steel business is only temporary. And it won't be very long before it's reaching toward new heights.

Mr. Worthington said that his forecast of a big hike in steel use illustrates ". . . the magnitude of the job ahead of us. We must think not only in terms of expansion of our physical plants and facilities, but also of increased productivity, better cost control, better training of our personnel; and above all, faster and more efficient service to our customers."

Cooking With Gas

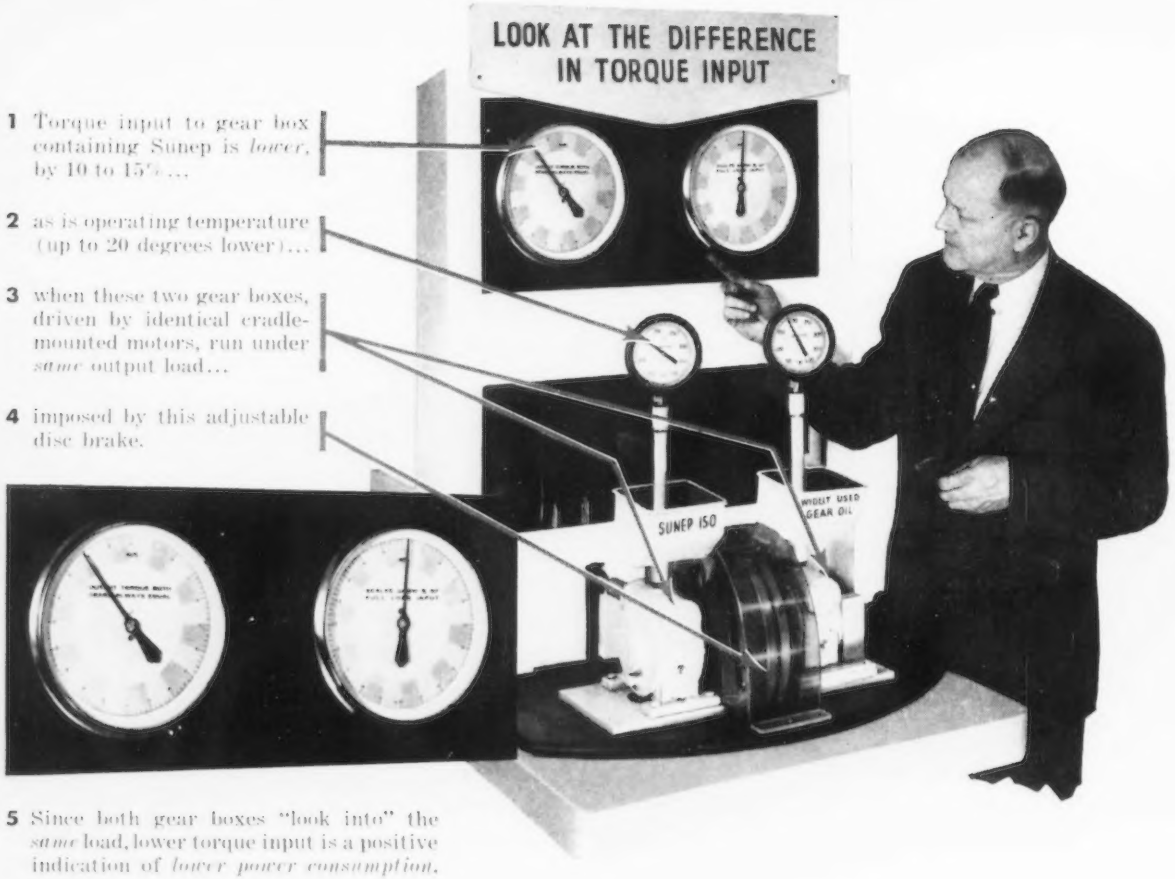
If you're making gas heating equipment, the Farwestern States will be a major market for you within three years. Educated estimates are that there will be 750,000 new customers for your product.

Housing starts are up in the Farwestern States. With only 13 pct of the U. S. population, the area is putting up 28 pct of the new homes. And California leads all the other states by a wide margin.

The constant influx of new residents is a ready-made market for home appliances: automatic washers, electric and gas dryers, and ironers.

Wing Fixtures Readied for a New Bird

LOOKING AHEAD: Blueprints for large tooling fixtures to fabricate wings of Convair 880 commercial jet transport are checked. Half the length of all six wing bucks, three right and three left, are shown.



This test rig proves...

SUNEP CUTS POWER CONSUMPTION, REDUCES OPERATING TEMPERATURES

TIME AND AGAIN, under equal operating conditions, Sunep® gear lubricant has demonstrated its superiority over competitive oils. Sunep is a high-quality, extreme-pressure lubricant that is also recommended for screws and heavily loaded bearings.

In addition to extreme-pressure characteristics, Sunep has the ability to combat rust and corrosion. All additives are compatible and do not drop out during use or prolonged storage. These advantages add up to savings in money and equipment for you.

For complete information about Sunep oils, call your Sun representative or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-12.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY Philadelphia 3, Pa.

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SUNOCO®

New Orders Slump to 7-Year Low

Builders Scrape Bottom of the Backlog Barrel

The machine tool industry is bracing itself for a lean period ahead.

Depleted employee rolls could hamper a sudden mobilization effort.—By E. J. Egan, Jr.

▪ Machine tool builders took another shellacking in October. Net new orders for metal cutting machines added up to only $27.9 million. It was the industry's poorest new-order month since February, 1950, and the second straight one in which incoming business failed to top the $30 million mark.

Digging deep into their backlogs, trying to keep work forces intact and busy, builders shipped an estimated $60.9 million in October. At the production rate, the industry now has about 3.4 months work on hand. Unless the new order rate does an about face, billings will go downhill pretty fast in the next month or so.

Jobs, Dividends Tumble — Worker layoffs throughout the industry have already run into the thousands. Many plants have cut work weeks to 35 hours. There won't be any extra dividends for investors to tuck into their Christmas stockings this year. In some cases, there won't be any dividends at all.

This is nothing new to machine tool builders, nor to the hardy breed of investors they attract. The industry is famous for its alternating business pattern of doldrums followed by mad rushes to meet some sudden demand. The trouble is that, more often than not, it has taken a war to start a rush.

Preparedness Suffers — Therein lies the real danger of the machine tool slump, many observers feel. It wouldn't be easy for a groggy industry to get up off the mat and start swinging with full force. Builders wonder now what has happened to all the proposals to keep machine tool firms fully staffed and at peak efficiency to meet any national emergency.

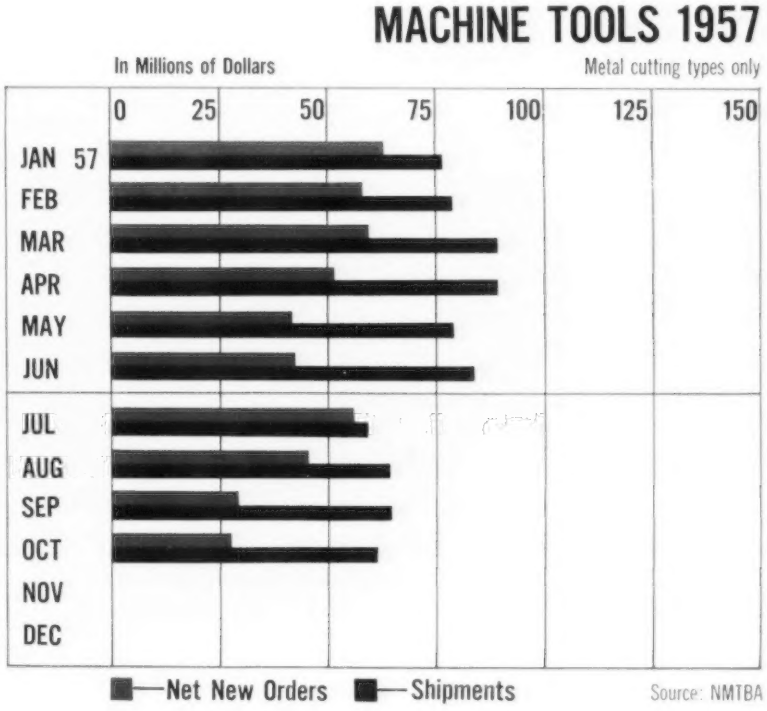
Sure, there is an M-Day Machine Tool Program that can be triggered at a moment's notice. It covers about 15,000 general purpose tools that builders will hasten to produce if they get the word. But pulling the trigger today in an understaffed plant would cause a small pop compared to the bang it would have made a year ago.

Builders are sure that business will pick up eventually, but they have no way of knowing how soon. Nor do they know whether the situation might even get a little worse before it gets better. Whatever happens, all of them declare they're in the fight to stay.

Oldest Lathe Contest

Where is the oldest American made engine lathe being used in the U. S.? The American Machine Tool Distributors' Assn. would like to know. It's sponsoring a contest among its member firms to smoke out the answer. Museum relics don't count. The prizewinning entry has to be under power and in actual use.

The contest closes January 15, 1958. If you think you have a winner, tell your distributor.



INDUSTRIAL BRIEFS

Steam Heat—Standard Oil Co. of California has awarded The Hour Corp., Ltd., a contract over $2 million to design, engineer, and construct a 275,000 pounds-per-hour steam generating plant and attendant facilities at its El Segundo, Calif., refinery. Construction is scheduled to begin August, 1958, with completion set for March, 1959.

Showing Their Mettle — Vitro Corp. of America received the 1957 Chemical Achievement Award for developments in solvent extraction of uranium. The presentation, by Chemical Engineering Magazine, is a group award this year for extractive metallurgy in the atomic age. Solvent extraction equipment is now being installed at Vitro's Salt Lake City mill. New facilities at Vitro Rare Metals Co. in Canonsburg are under expansion programs totaling more than $3 million. The new processing techniques will boost throughput of the Salt Lake City mill to 660 tons per day.

Getting Together—U. S. Industries has merged two of its divisions. The Chicago Steel Tank Co., for administrative purposes, has been merged with the Solar Permanent Co., a USI division. These divisions will be under the direct supervision of A. Sternberg, general manager of Solar, who will direct both activities from offices in Chicago and Tomahawk, Wis.

Smog Sleuths—The Research & Development Dept., Pittsburgh Coke & Chemical Co. has a U. S. Public Health Service contract to develop new type smog sampling equipment. Purpose is to design a more efficient collector of smog pollutant samples for subsequent identification and analysis, and to develop sampling techniques. Scientists will aim at 99 pct or better sampling efficiency in collecting most air contaminants.

More Nuclear Business—Lockheed's Georgia Div. is entering a new nuclear field—the design and building of atomic reactors to be used as a source of power and of heat. The company is currently building a nuclear research laboratory for the Air Force near Dawsonville, Ga. First runs on the test reactor to be installed at the laboratory will begin late in 1958, with full operations scheduled for about March 1, 1959.

Marketers Deluxe—The manufacturing, selling and servicing activities on Magnesyn aircraft instruments are now being handled by the Friez Instruct Div., Bendix Aviation Corp. The Magnesyn line of aircraft instruments includes transmitters and remote indicators for measuring fuel, oil torque, water, manifold, and hydraulic pressures. The consolidation gives the Friez Div. responsibility for all marketing through distributors, and directly to the airframe manufacturing field.

Welcome Empire-Reeves — Presidents of the Universal-Cyclops Steel Corp., Bridgeville, Pa. and Empire Steel Corp., Mansfield, O. have announced an agreement which will lead to the consolidation of these companies. Empire-Reeves Steel Corp. will be formed to operate the Mansfield and Dover, O., plants as a wholly owned subsidiary of Universal-Cyclops. No changes are contemplated in the personnel, operations, or distribution policies of any of the companies as a result of the consolidation.

On Target—A portable, tactical early warning (TEW) system is being developed for the U. S. Marine Corps by Sperry Gyroscope Co. The new long-range, search and height-finding radar system will detect close-in or distant high-speed, enemy aircraft and missiles. This system can be quickly transported by helicopter, cargo-type aircraft, truck or amphibious vehicle. It can be brought into operation in a battle area within a two-hour period.

Joining the Cast — Pennsylvania Malleable Iron Corp., Landisville, Pa. has opened its new Malleable Iron Foundry. The first metal was poured Oct. 31. This plant, which is said to be the first completely new jobbing malleable iron foundry built since World War II, will duplicate the facilities of the company's main plant in Lancaster, Pa. It is equipped with the latest in melting, sand handling and cleaning machinery to produce malleable iron castings up to 25 lbs. in weight.

Diamond Jubilee—The Dominion Bridge Co. is now engaged in a $20 million expansion program designed to increase its capacity by 40 pct in 1960. Last month the company celebrated the 75th anniversary of its founding in 1882 at Lachine, Quebec. The contrast offered by the first plant built in 1883 to construct steel railway bridges, and the expanding, diversified company of today, is dramatically highlighted in an anniversary brochure commemorating this occasion.

All the Ships at Sea—A new manual, destined to be a valuable aid to ship personnel in the porcelain enameling industry, has been released by Porcelain Enamel Institute's Process Development Committee. The 32-page manual, Process Controls, is divided into 2 major sections—Enamel Slip Controls and Pickle Room Controls. The manual also contains an appendix which discusses standard report forms used in the enameling shop.

Faraway Places — Twenty-seven locomotives valued at $1.9 million were shipped to foreign and domestic industrial and mining customers from General Electric's locomotive and car equipment plant in Erie, Pa., during October. Units represent the largest production of these types of locomotive for any one month in recent years. Shipments were made to Argentina, Brazil, India, Nova Scotia, and Venezuela as well as to factories and mines in seven states.

ACCO for Better Values

SPEEDY SLING SERVICE with ENGINEERED SAFETY!

ACCOLOY® KUPLEX SLING CHAINS

Quick Service from Distributor's Stock!

• Your nearby ACCO Authorized Sling Chain Distributor now offers a new sling service that saves time and money for you. This is made possible by American Chain's sensational, newly-designed **ACCOLOY KUPLEX Sling Chains.**

SAFE, STRONG, STREAMLINED

These slings are the *latest and greatest development* in sling chains. All parts in each leg are manufactured *exclusively* by American Chain, of the same alloy, and engineered to be as strong as the chain itself. They are of a streamlined design that reduces the possibility of catching or snagging.

Finally the component parts are factory proof-tested to twice the working load limits—your assurance of maximum strength and safety.

Another valuable feature: all parts remain visible for easy, periodic wear inspection.

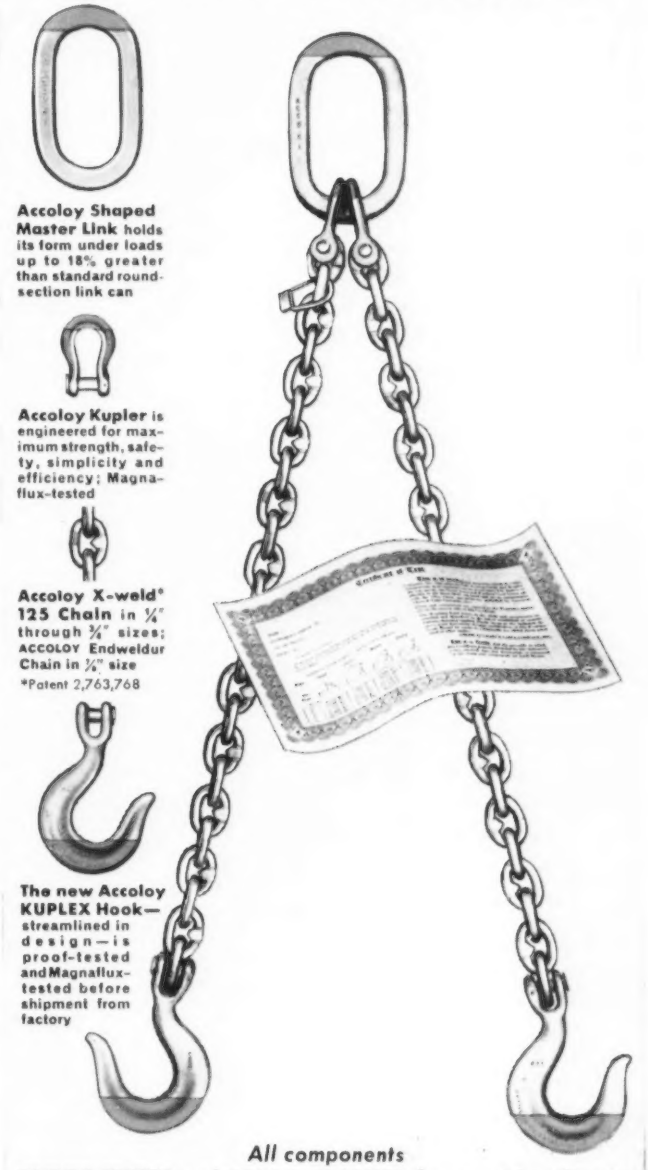
TWO STYLES—SIX SIZES

The new ACCOLOY KUPLEX Sling Chains are available in single-leg and two-leg styles and in six chain sizes, from ¼" through ⅞". All chain is made of Accoloy 125 material. All component parts of each assembly are marked and easily identified as to the size of chain with which they are to be used. Components are *color-marked in* orange for easy identification.

CERTIFICATE OF TEST, issued by ACCO and signed by your Authorized Distributor, is furnished with each sling shipment.

GET THE COMPLETE STORY

You will find it to your advantage to learn the full story of ACCOLOY KUPLEX Sling Chains—how easy they are to assemble and disassemble . . . how promptly and easily they can be serviced...and how you can benefit from this Great New Distributor Service and this Great New Sling Chain. Write for **Folder DH-54** and name of nearest ACCO Authorized Sling Chain Distributor.



Accoloy Shaped Master Link holds its form under loads up to 18% greater than standard round-section link can

Accoloy Kupler is engineered for maximum strength, safety, simplicity and efficiency; Magnaflux-tested

Accoloy X-weld* 125 Chain in ¼" through ⅝" sizes; **ACCOLOY Endweldur Chain** in ⅞" size

*Patent 2,763,768

The new Accoloy KUPLEX Hook—streamlined in design—is proof-tested and Magnaflux-tested before shipment from factory

All components
PROOF-TESTED and COLOR-MARKED for easy identification

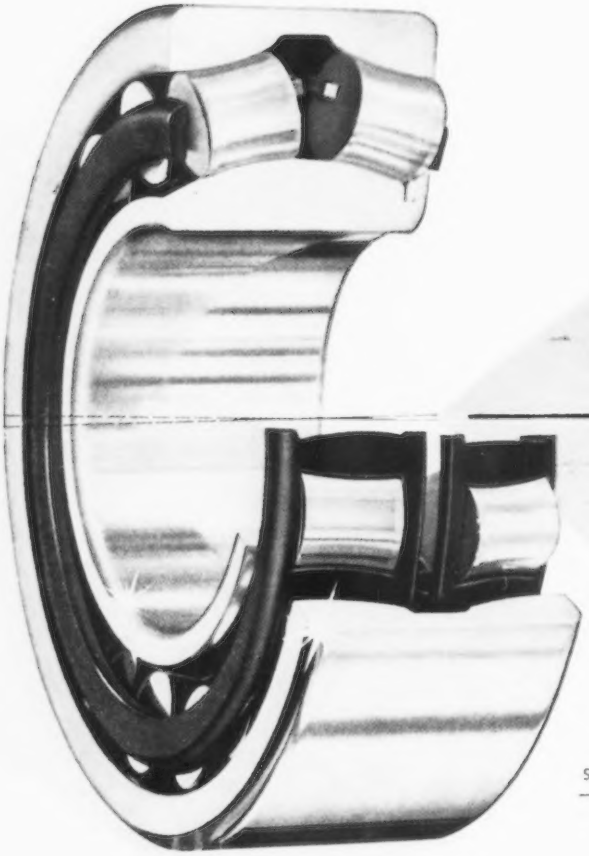
American Chain Division
AMERICAN CHAIN & CABLE
Bridgeport, Conn. • Factories: *York and *Braddock, Pa.

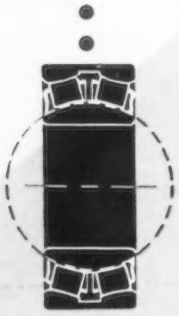
Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

Indicates Warehouse Stocks

ACCO TRADE MARK

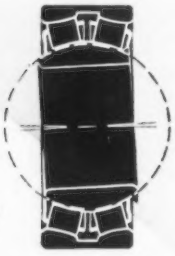
Self-aligning TO KEEP ITS CAPACITY IN ROUGH, RUGGED SERVICE





THIS IS SELF-ALIGNMENT. Spherical inner ring is free to align itself in any direction. Thus . . .

FULL LOAD CAPACITY is always assured, regardless of shaft deflection or misalignment.



Series 22200 and 22300 —22500-A and 22600-A roller bearings

Spherical LINK-BELT roller bearing compensates for shaft deflection, weaving of supports

MANY leading makers of tough duty equipment now design without bulky supports to prevent deflections. They're using this spherical Link-Belt roller bearing that *compensates for misalignment* . . . always keeps its full capacity for handling radial and thrust shock loads without "pinching."

In addition, it's factory-adjusted, easy to mount and available everywhere with internationally standardized boundary dimensions.

Link-Belt also makes industry's most complete line of ball and roller bearing blocks. They're all in Book 2550—yours for the asking at any of 40 Link-Belt offices or our Authorized Stock-Carrying Distributor.

14 443-A

LINK-BELT

self-aligning ball and roller bearings

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

D. F. Shaw, appointed vice president, Kaiser Engineers, Div. of Henry J. Kaiser Co., Oakland, Calif.

R. M. Powell, appointed executive vice president, sales, and **J. L. Roach,** promoted to general sales manager, Wyman-Gordon Co.

J. H. Krey, elected vice president, United States Foil Co., Richmond, Va.

H. H. Northrup, named manager, Chicago steel plant, Republic Steel Corp.

J. C. Whetzel, appointed manager, tin plate products, U. S. Steel Corp. He succeeds **G. E. Totten** who retires.

D. T. McLennon, appointed direct salesman, New England, Cutter Div., The Ingersoll Milling Machine Co., Rockford, Ill.

J. R. Barefoot, elected president, The Federal Machine & Welder Co., Warren, O.

R. P. Carpenter, named manager, Buffalo, N. Y., steel plant, Republic Steel Corp.

Victor Valaska, appointed foundry superintendent, W-K-M, Div. of ACF Industries, Inc.

Gene DuGar, appointed district manager, Baker-Raulang Co.

W. H. B. Geoghegan, appointed director, engineering, Union Carbide Olefins Co., Div. of Union Carbide Corp.

J. J. Reardon, appointed industrial engineering supervisor, Building Products Div., American Welding & Mfg. Co., Warren and Niles, O.

C. J. Petry, appointed assistant to the chairman, Acme Steel Co., Chicago.

C. L. Gardner, appointed executive staff secretary, Executive Dept., Republic Steel Corp.

C. F. Crow, named Bristol, Conn., plant manager, New Departure Div., General Motors Corp.

H. C. Smith, named sales manager, Micarta Div., Westinghouse Electric Corp., Hampton, S. C.

E. M. Smith, appointed sales manager, Cleveland Div., H. K. Porter Co.

L. C. Fitzgerald, appointed manager, sales, Chicago district, U. S. Steel Supply Div., U. S. Steel Corp.

J. R. Strother, named asst. sales manager, industrial hose products, Flexonics Corp., Maywood, Ill.

J. G. Berry, elected president The Berry Steel Corp., Kenilworth, N. J.

R. E. Lyon, appointed sales manager, Manufacturing Div., Precision Steel Warehouse, Inc., Downers Grove, Ill.

G. E. Yeakley, appointed general construction superintendent, Elevator Div., Westinghouse Electric Corp.

J. M. McCarthy, becomes vice president and comptroller, High Voltage Engineering Corp., Burlington, Mass.; **L. R. McIntosh,** named vice president and general

manager; **E. A. Burrill,** will act as vice president and sales manager; **G. E. Bulwinkle,** named vice president and production manager; **J. L. Danforth,** promoted to vice president and director, mechanical engineering; **A. J. Gale,** named vice president and director, applied physics; **J. C. Nygard,** elected vice president and director, electrical engineering; **J. H. Scotney,** becomes vice president and installation service manager.

E. W. Flamme, appointed district sales manager, Portland, Ore., district sales office, Reo Div., The White Motor Co.

Robert Twells, appointed group executive, Spark Plug Div., Electric Auto-Lite Co., Toledo, O.

P. M. Christensen, appointed coordinator, engineering, Federal Pacific Electric Co., Newark, N. J.

A. R. Eakins, appointed general sales manager, Refractories Div., H. K. Porter Co., Inc.

G. C. Lichty, appointed Northwestern district sales manager, Yale lift trucks, Yale Materials Handling Div., The Yale & Towne Mfg. Co.

J. P. Kates, appointed patent attorney, Technical Products Dept. and Communication Products Dept., General Electric Co.'s Industrial Electronics Div., Syracuse, N. Y.

R. C. Carson, promoted to director of purchases, Federal-Mogul-Div., Federal-Mogul-Bower Bearings, Inc., Detroit.

P. A. Christenson, appointed works manager, Industrial Controller Div., Square D Co., Milwaukee.

L. S. Brock, appointed manager, structural and plate products, U. S. Steel Corp.

Following appointments are within the Warehouse Div. of Jones & Laughlin Steel Corp., Indianapolis, Ind.; **C. A. Burke,** appointed division manager, sales, flat rolled products; **E. S. Lewis,** named special sales representative, national accounts; **S. H. Coddington,** appointed division manager, opera-

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F. R. Palmer, named president, Carpenter Steel of New England, Inc.

T. E. Moffitt, elected president, Hooker Electrochemical Co., Niagara Falls, N. Y.

A. J. Scheel, appointed general superintendent, Fairless Works, National Tube Div., U. S. Steel Corp.

G. B. Goodwin, appointed district sales manager, Los Angeles district sales office, Universal-Cyclops Steel Corp.

S. W. Kittredge, appointed asst. chief engineer, Sharon Steel Corp.

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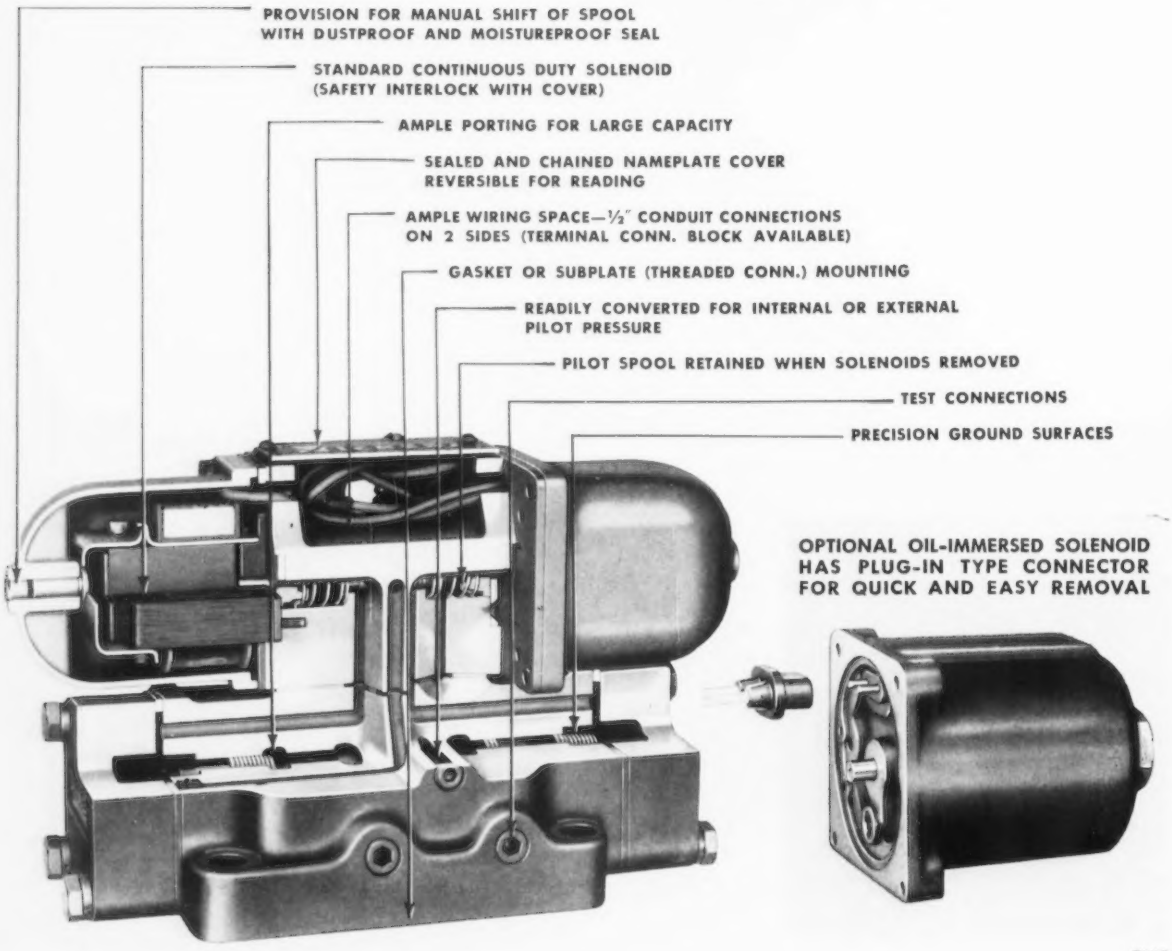

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L. E. Russell, named superintendent, reduction, Rooseveltown, N. Y., plant, Reynolds Metals Co.

E. J. Baumrucker, appointed vice president, domestic press sales, Clearing Machine Corp.

Barry Passman, appointed director, engineering, Graflex, Inc.

W. C. Miller, appointed sales manager, National Precision Castings Corp., Reading, Pa.

Lindsay Bleakley, named general manager, East Chicago Machine Tool Corp., E. Chicago.

W. W. Goehring, appointed manager, Manufacturing Dept., F. J. Stokes Corp., Philadelphia.

D. O. Egbert, appointed district manager, San Francisco, Spang-Howarduct Div., The National Supply Co.; **C. C. Brush,** appointed chief field engineer; Spang-Chalfant Div.

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Texas Eastern Transmission Corp., Shreveport, La.

Laird Anderson, appointed manager, manufacturing planning and production engineering, Edsel Div., Ford Motor Co., Dearborn, Mich.

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Charles Snyder, appointed sales promotion manager, Stone Machine Co., Inc., Manlius, N. Y.

H. J. Goldman, appointed asst. sales manager, Southwest region, Rolled Steel Corp., Skokie, Ill.

W. W. Gould, appointed manager, Chicago district office, Edison Storage Battery Div., Thomas A. Edison Industries, McGraw-Edison Co.; **E. W. Ahlstrom,** appointed manager, Cleveland district office; **J. V. Huth,** named manager, Export Dept.

W. J. Neagles, appointed general sales manager, Turchan Follower Machine Co., Dearborn, Mich.

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D. T. Bixby, named asst. manager, Standard Products Div., De Laval Steam Turbine Co., Trenton, N. J.

B. G. Behrens, appointed sales application engineer, Seattle office, Vickers, Inc.

C. E. Ripka III, appointed purchasing agent, Bridgeport, Conn., plant, Heppenstall Co.

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Meteorites: Metallurgy From Outer Space

By P. M. Unterweiser—Metallurgical Editor

Why is it that meteorites have solved the "reentry" problem a thousand times over? Is it their metallurgical structure? Their composition?

Here are some of the fascinating facts about Nature's own missiles from outer space.

▪ If you're impressed with the Sputniks, please take a closer look at Nature's unguided missiles — the meteorites. For the average meteorite on its way down makes the Sputnik on its way up look like a study in slow motion.

Here's why: the ascending Sputnik achieves a maximum speed of about 18,000 mph. The meteorite —an irregularly-shaped mass of stone or iron—whizzes through the earth's atmosphere at speeds of 30,000 mph or better. What's more, these "falling stars" have been beating the "reentry problem" every day of the week for the past billion years.

Reentry is one of the crucial problems facing missile scientists and engineers. Missiles should contain metals able to survive the terrific frictional heat built up on reentering the earth's atmosphere. This may call for the development of new metals and alloys. Since meteorites have made the trip, some answers to these materials needs may lie in the metallurgy of meteorites.

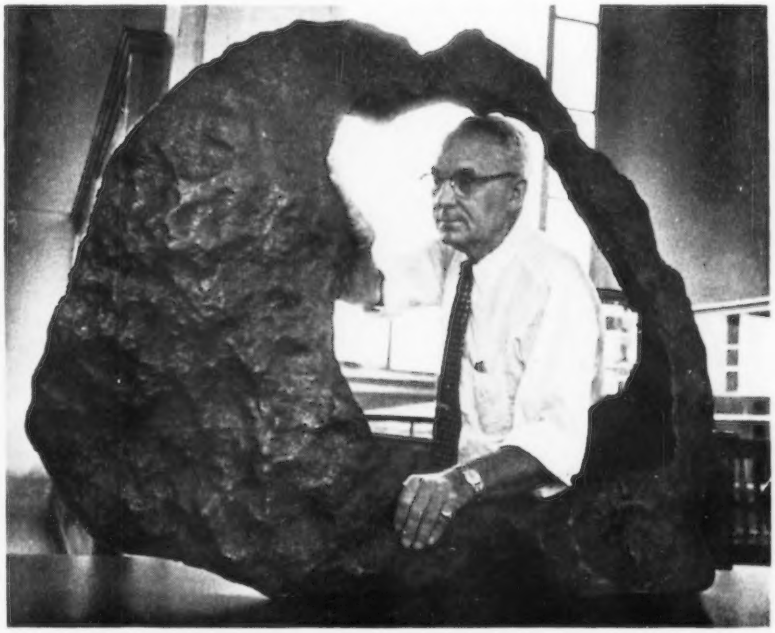
Massive Lumps—The U. S. National Museum houses one of the world's finest collection of meteorites. In a musty wing of the Natural History building, these massive lumps of stone and iron rest in peace on a cold, marble floor. Permanently grounded, they are man's souvenir of outer space.

If you examine them close up, you'll notice that the "stonies" have deep ripples and crevices all over their surface. The "irons" are oddly shaped, severely pock-marked. Here and there, a hole occurs. Some have burned clear through.

Quick Trip—Stone or iron, these are remarkable objects. Nobody is sure of their origin. What is known: some of their outer markings were caused by the brief trip through the earth's atmosphere. And what a trip!

Now and then, they've dropped into the earth's orbit moving against the direction of the earth's motion. When this happens, circumstances combine to provide the ultimate in meteorite travel. The speed of the meteor can then be added to the normal moving speed of the earth. In which case the meteor may strike the earth with the force of an object streaking along at more than 160,000 mph.

Landing Force—If the meteor



METEORITE EXPERT: Edward P. Henderson, Associate Curator, U. S. National Museum, examines one of his favorite subjects.

CROSS-SECTION: Goose Lake, Calif., iron meteorite, as etched, shows a typical Widmanstatten structure, resembling a kind of basket weave. Inclusions are very high in carbon. Nickel content is over 5 pct.

weighs 1000 lb or more, the collision packs a terrific wallop. Example: the landing of a meteorite in Canyon Diablo, Arizona, produced a crater one mile in diameter, 1000 ft deep. Its landing force was enough to wipe out a fair-sized city.

Canyon Diablo was only one of many. It staged an impressive and devastating performance. Still, few scientists paid it much heed. It was, after all, only a meteorite. And meteorites were natural curiosities mulled over by a handful of experts trained in a vague science called "meteoritics." All things considered, a very narrow specialty.

That was the way it was. That was the way it promised to continue—until recently.

New Stardom—Little by little, the meteorite boom began to spread. Now, at the height of the Sputnik furor, the previously ignored has become a center of attraction. Meteorites have at last achieved terrestial stardom.

Chalk it up to their victory over the "reentry problem." For with few exceptions, meteorites are still the sole survivors of the trip to earth from outer space. Objects for research, they are now being probed by some of the world's leading scientists. In the U. S., both the Air Force and the A. E. C. are hot on the meteor trail.

Expert's Specialty—A very few men have been following that trail for a long time. One of them is Edward P. Henderson, Associate Curator at the U. S. National Museum. He has been studying meteorites for almost 30 years. He is an expert whose preeminence even the Russians seem to acknowledge.

On the Move—One of his prized iron meteorites recently achieved renewed mobility. It took off from Washington, D. C., and landed in Columbus, Ohio. There, at Battelle Memorial Institute, it is being cut up for metallurgical analysis.

Meteorites aren't easy to slice. When Battelle's metallurgists saw their newly acquired specimen for the first time, they figured the sectioning could be handled in a few days. Henderson was surprised at their optimism. He was right. Two months later, their machine shop was still sawing away, with a few more inches to go.

Fine Examples—The experts feel it's effort well spent. There's a lot of metallurgy yet to be learned from iron meteorites. Most of them contain slightly over 5 pct nickel and about 91 to 94 pct iron. It is Henderson's opinion that they are possibly the finest examples of phase relationships in nickel steels.

Because meteorites have cooled slowly under considerable pressure, they are likely to provide information on the iron-nickel phase diagram that can't be found in the textbooks. That's because the conventional diagram covers only those conditions observed at normal atmospheric pressures. Meteorites might hold clues to the higher pressure phases.

Typical Structures—A number of iron meteorites already examined show a typical Widmanstatten (basket weave) structure. A well-defined example of this structure can be seen in the etched section of the Goose Lake, Calif., meteorite. Notice the preferentially-oriented plates of alpha iron.

Discussing the structure of the Canyon Diablo meteorite, C. R. Simcoe of Battelle noted that "since the Widmanstatten pattern shows the same orientation over the entire cross-section of the meteorite, it apparently formed within a single crystal of gamma iron. In fact, most iron meteorites that have been sectioned show only a single orientation of this structure. Therefore, they must be smaller than the individual grains of gamma iron of the body from which they were produced.

"Such grains are fantastically larger than those in man-melted iron and it must be assumed that

the original body cooled extremely slowly from liquid to solid. This cooling rate was probably maintained down through the transformation which occurs from 1300° to 800°F for an iron containing 7 pct nickel."

Slight Loss—The possible contribution of meteorite metallurgy to the reentry problem is still a matter of speculation. Contrary to popular belief, Henderson is convinced that iron meteorites lose little of their original mass as a result of their flight through the earth's atmosphere. This can be convincingly established by a careful examination of a meteorite's outer surface.

Another highly significant point: thermal penetration from the surfaces of a meteorite inward is amazingly slight. It seldom exceeds $\frac{1}{4}$ in. This, despite the fact that the surfaces are heated to the molten state and iron is a fair thermal conductor.

Check Points—Iron meteorites are identified by:

1) MAGNETISM. All iron meteorites are strongly magnetic.

2) MALLEABILITY. Magnetic terrestial minerals are brittle. Meteoritic iron is malleable.

3) COLOR. Remove the surface oxides from a small spot to check the color. The iron of a meteorite is gray, similar to the color of a 5 cent piece.

4) SOUND. Tap the object. If it's an iron meteorite, it will have a metallic ring.

5) WEIGHT. Meteoritic iron is very dense. Thus meteorites always seem especially heavy for their size.

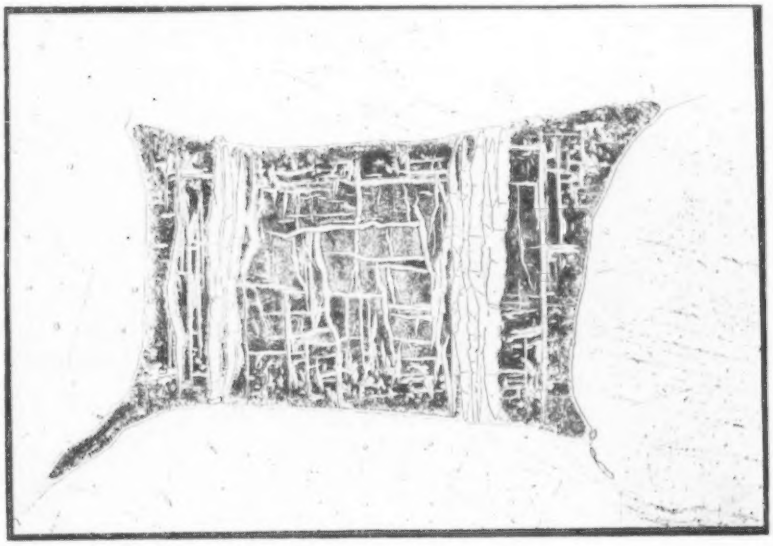
Big Question—Are falling meteorites a hazard? Here is Mr. Henderson's answer to the question:

"To some extent, I guess they always have been and always will be. But in this 'trigger-happy' world, the hazardous aspects have increased in an unexpected way.

"It rocks you back on your heels to think of what might happen if a meteorite were to suddenly flatten a city like Stalingrad, let's say, or Detroit. Would people wait until the true cause of the trouble was determined? Or would the buttons of destruction be pushed — and no questions asked?"

It's something to think about.

TYPICAL STRUCTURE: Ground mass of the metallurgical structure of the Goose Lake meteorite consists of alpha iron (kamacite). The scattered, small inclusions are phosphide bodies known as rhabdites. Two stringer-like bodies at the bottom of the picture are taenite gamma iron, a nickel-rich alloy. What appears to be scratches on the surface are actually Neumann lines, resulting from high compressive forces. Magnification is 50X.



CLOSE-UP: The surrounding structure consists of alpha iron marked with Neumann lines. The oblong-shaped mass in the center consists primarily of imperfectly transformed alpha-gamma iron. The needle-like lamellae show a preferred orientation. These, too, are made up of alpha iron. Etched in picral for 30 seconds, the magnification of this photomicrograph is 100X.

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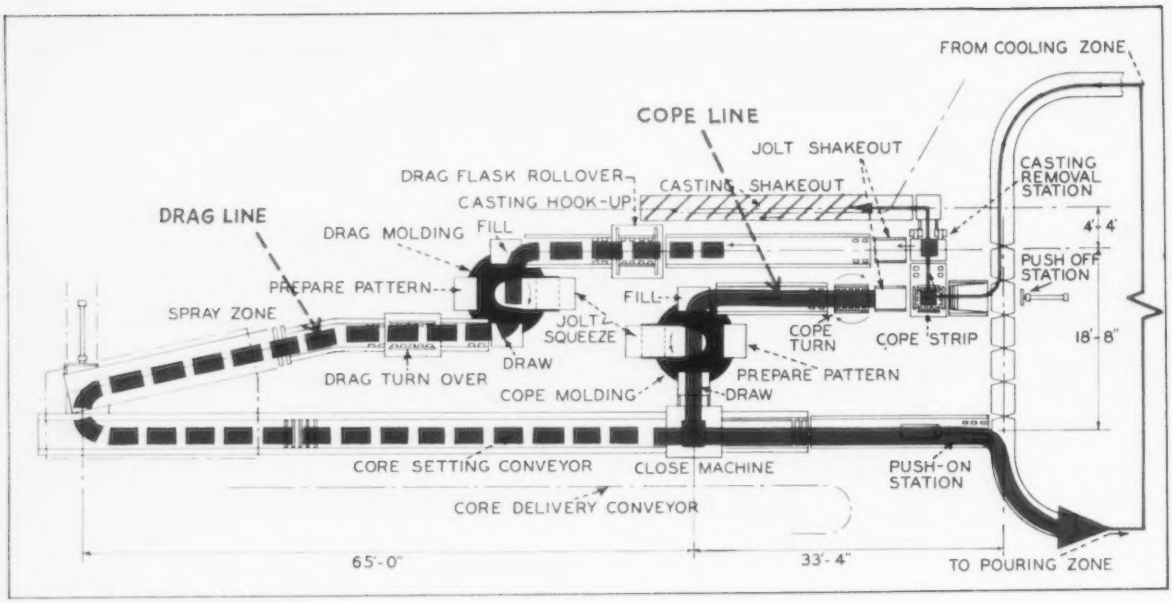


MOLDING CYCLE: A master panel with pre-set timing controls each step in the intergrated setup.

Handling Units Speed Foundry

Heavy, bulky flasks go through many steps.

It takes a master control unit to get the most out of mechanized handling in each step.

One foundry finds benefits in automated setup.

▪ After two years of automatic cylinder block production, the foundry staff at Pontiac Motor Div., Pontiac, Mich., looks back to the time when it doubted the job could be done efficiently. It's one thing to transfer blocks weighing several hundred pounds. It appeared much more difficult to do the job on flasks, filled with molding sand and blocks and weighing a ton or more.

Pontiac's foundry engineers overcame the transfer problem and many others in cooperation with Osborn Mfg. Co., Cleveland.

Output Proves Worth — The foundry produces 150 V-8 block castings per hour, an average of 2400 blocks per day. Only 28 men do the work that took 68 men on former block molding operations.

Without the need of once manually handling the flask, the unit performs molding, closing, and shaking out. Panel lights indicate operations in progress.

Workers are on hand only for setting chaplets and cores, pouring, drag spraying, and cooling blocks.

The handling equipment is built in multiples of flask lengths. Pusher cylinders and conveyors do the job of moving the heavy flasks.

Automatic Molding — Two Osborn four-station machines do the molding job, one for making copes, and the other for making drags.

At the drag molding machine, the metal pattern is blown off by an air jet and sprayed with a parting lubricant. The conveyor moves the drag flask into the filling station.

By moving upward inside the drag flask, the pattern picks up the flask. The upward motion opens the sand hopper gates to release a measured amount of sand.

With the mold and floating plates free of the indexing mechanism, jolting and squeezing takes place.

At the stripping station, a draw piston descends to draw the mold on rollers, returning the pattern to the indexing cradle arms. A conveyor moves the ejected mold to a turnover station.

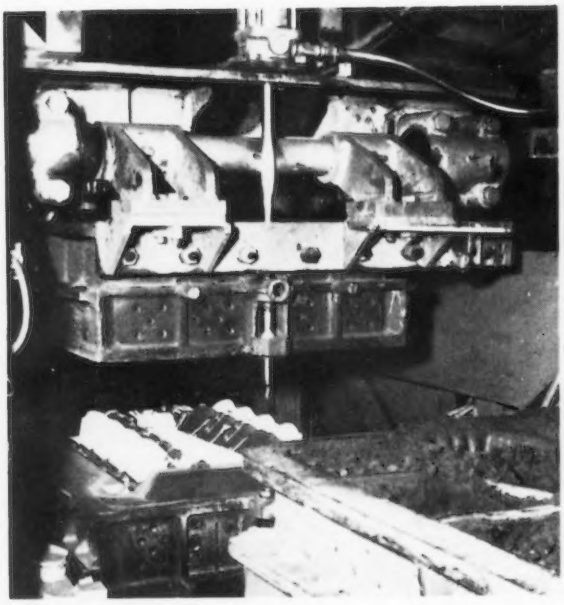
Turned face-up, the drag mold is sprayed with a fast-drying graphite solution. After spraying, the mold is pushed onto the coring conveyor. In a matter of seconds the core setting fixture positions seven preassembled cores.

Unit Handles Closing — Meanwhile, the other molding line is processing the cope. The completed cope moves directly over the drag. The closing unit lowers the cope onto the drag and accurately closes the mold.

Traveling on the pouring conveyor, the closed mold reaches the pouring station. After the pouring, the mold cools on the conveyor for a specified period.

At the jolt shakeout area, the casting is removed and the flask

CORE SETTING: Positioning of fixture is one of the few manual operations. Guide pins insure proper set.



PRECISE CLOSURE: The closing machine lowers cope over cored drag to complete mold preparation.

Cycle

emptied. The cope and drag halves are returned to the molding machines.

The handling equipment is so integrated with the molding machines that flasks approach and enter the machines at the proper intervals. The master timer actuates solenoid valves to effect indexing and transfers.

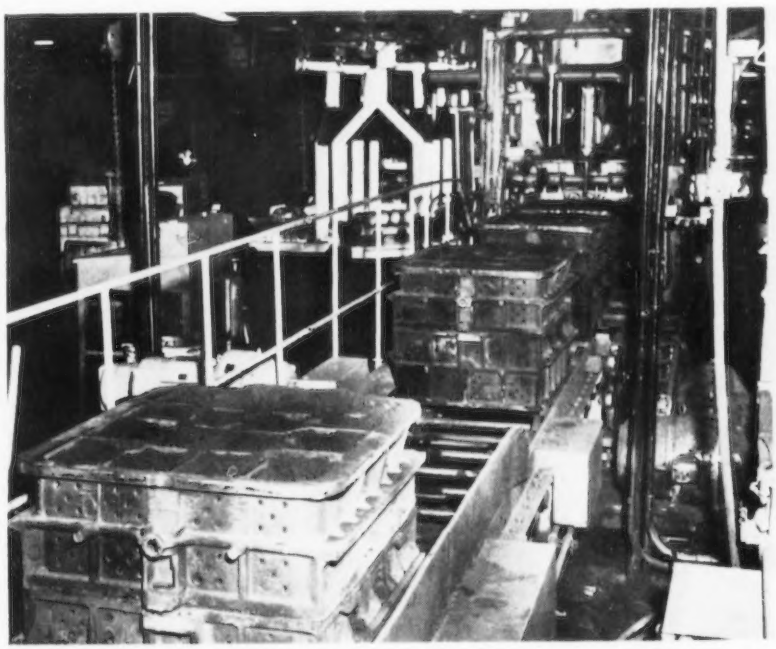
Sand from the shakeout is checked by probes. The correct amount of water and bonding material is added. After mulling the sand is returned to the molding machine hopper.

High Core Output—Eleven Osborn Roto-Core units turn out the core requirements. One such machine, for example, can turn out 360 barrel and crankcase cores an hour.

These five-station machines blow and draw the core boxes on a preset time cycle. The cores are baked, assembled, and conveyed automatically to the molding line. In reducing the number of cores for the cylinder block castings to seven, Pontiac simplifies production.

The successful operation of the automatic units owes much to a well-planned preventive maintenance program.

A four-man maintenance crew for each of the two operating shifts consists of a pipe-fitter, electrician, millright and repairman. A third-shift crew cleans, checks and repairs all key operations and machinery units during the nonoperating period.



HEADED FOR POURING: Completed molds, weighing 2100 lb each, proceed on roller conveyor to pouring line.

How to Get Stronger Al-Fe Bonds

The part played by pressure in hot pressure bonding of aluminum and iron may call for some drastic revisions in our basic data.

Its marked effect on bond strength indicates that phase diagrams will have to be extended to include this important variable.

By Samuel Storchheim—President & Technical Director, Metals Research & Development, Inc., Exeter, Pa.

▪ Recent studies of hot pressure bonding show that bond strength between aluminum and other metals is greatly affected by variations of temperature, pressure and time. The right combination will produce bonds approaching the strength of the parent aluminum, with little or no intermetallic alloy formation.

In fact, an increase in pressure alone will raise the bond strength, whether the alloy zone formed is inhibited or promoted by pressure change during hot pressing.

Earlier work dealt with aluminum-nickel, aluminum-copper and aluminum-zirconium systems. The latest study, which confirms results

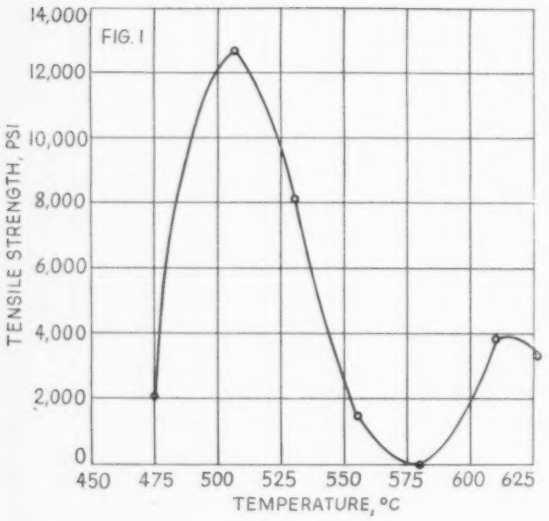


FIG. 1: Ultimate tensile strength of aluminum-iron couples rises as temperature goes up, falls, then rises again. The couples were pressed at 12 tons per sq in. for 60 minutes and in vacuum.

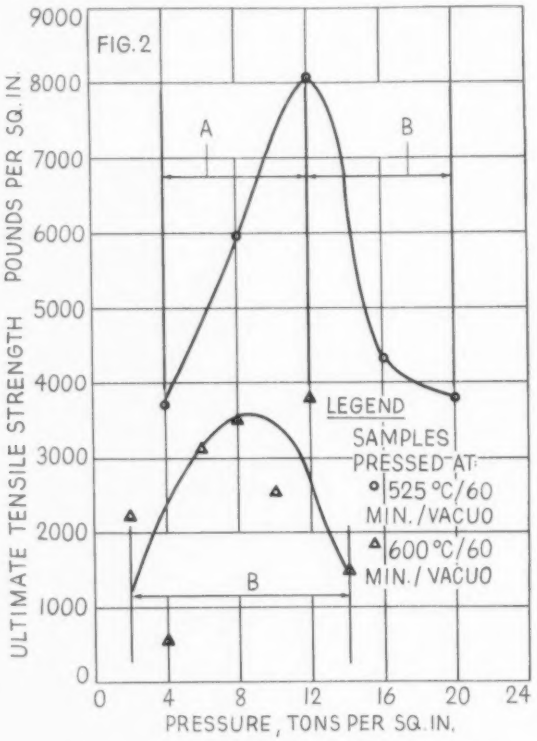


FIG. 2: Ultimate tensile strength for two sets of samples is plotted as a function of pressure. In both cases it rises, then declines. No alloy zone was visible in pressure-range A; an increasingly thicker alloy zone developed in both sets over the range indicated by B, and was accompanied by rapid decrease in strength as pressure went up.

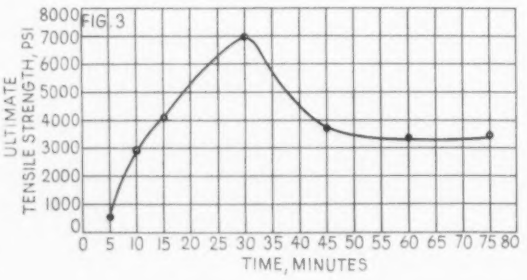


FIG. 3: Effect of hold time at reaction conditions is most pronounced in the first 45 minutes; after that, strength levels off. Samples were reacted at 625°C, 12 tons per sq in., in vacuo.

obtained in the others, concerns aluminum-iron bonds.

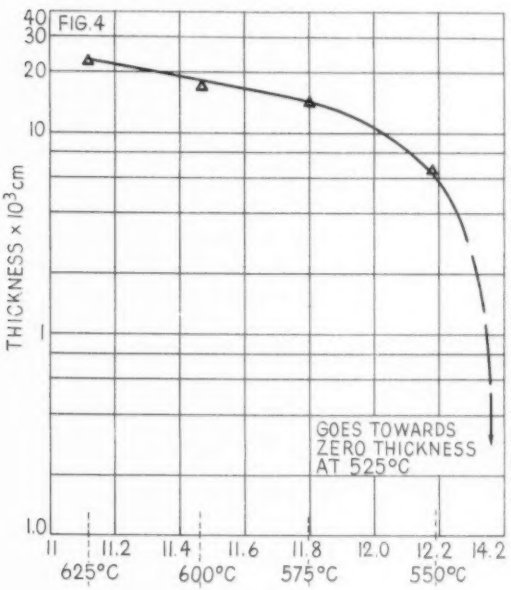
Commercial iron bar stock and 2S aluminum were used in the tests. Samples were prepared by chemically cleaning the aluminum and mechanically abrading the iron just before assembly for hot pressing. Couples were then hot-pressed under vacuum in an Inconel X die.

Rises Twice—Fig. 1 is a plot of ultimate bond tensile strength versus increasing temperature for specimens pressed at 12 tons per sq in. and held for 60 minutes in vacuum. Strength rises, peaks at about 12,500 psi and declines with increasing temperature, then rises again after declining to its minimum value. A similar rise was obtained in the aluminum-zirconium system.

Fig. 2 shows the effect on bond strength of increasing pressure for two sets of samples, one reacted at 525°C, the other at 600°C. In both cases, strengths rise, peak and then decline. Specimens reacted at 600°C show strengths considerably lower than those bonded at the lower temperature; a maximum of about 3500 psi for the former and 8000 psi for the latter.

Microscopic examination showed no alloy zone existed for the lower reaction temperature specimens from 4 up to 12 tons per sq. in., where strength was maximum. An increasingly thick alloy zone and rapid decrease in strength developed at pressures from 12 to 20 tons per sq in. An increase in alloy zone thickness was also noted for samples hot pressed at 600°C.

These two curves are not typical of those in the other three systems; bond strength usually increased with increasing pressure and normally levelled off at some peak value. Occasional slight drops after peaking were attributed to crack formation in the brittle intermetallics which normally developed. The



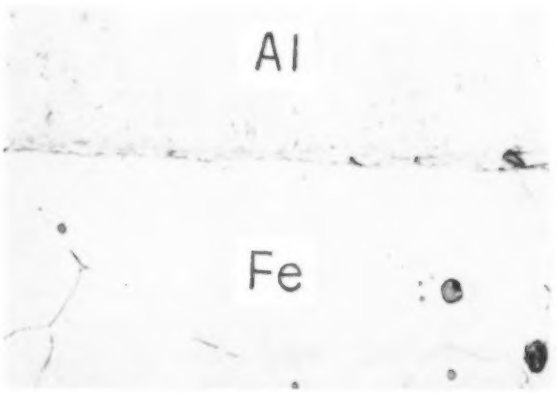
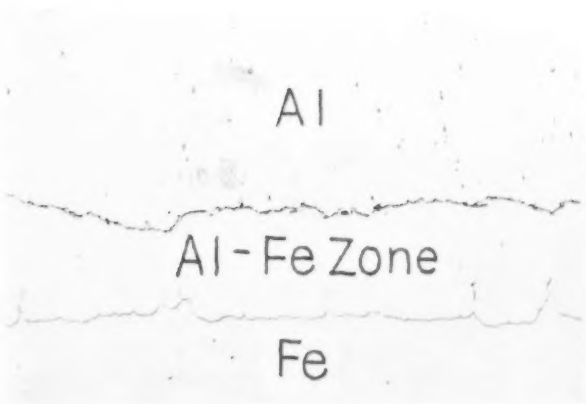


FIG. 4 (left): Effect of temperature on thickness of alloy zone formed in aluminum-iron couples at 12 tons per sq in., 60 minutes in vacuo.

FIG. 5 (above): Interface appears disturbed but no alloy zone is seen in couple pressed at 500°C, 12 tons per sq in. for 1 hour in vacuo. 500x.



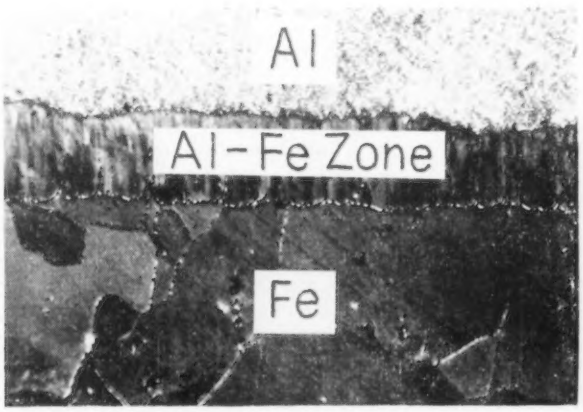


FIG. 6: Thick alloy zone is formed in sample hot pressed at 500°C and 12 tons per sq in. for 60 minutes in vacuum. Polarized light brings out the columnar shape of grains in the Al-Fe zone. 200x.

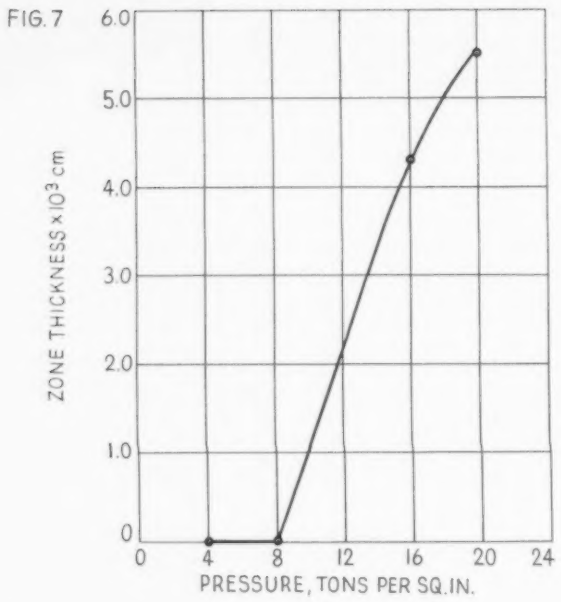


FIG. 7: Alloy zone thickness as a function of pressure for samples pressed at 525°C for 1 hour in vacuum. None formed at 4 to 8 tons.

FIG. 8: Alloy zone at 525°C, 20 tons pressure for 1 hour in vacuum. Same conditions at 8 tons produced structure like in Fig. 5.

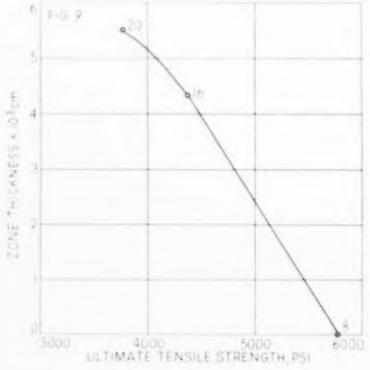


FIG. 9: Plot of strength as a function of alloy layer thickness shows relation between the two, pressed at 525°C, 1 hour in vacuo.

results presented here suggest that an increasingly thick alloy zone caused the decrease in strength.

Effect of Hold Time — Fig. 3 shows the strengths obtained for increasing holding time at 625°F and 12 tons per sq in. in vacuum. As with the aluminum-nickel and aluminum-copper systems, the aluminum-iron couple bond strength increases, peaks and declines; however, extended hold times at the reaction conditions produce no further decrease in strength once a minimum plateau is reached.

Fig. 4 is a plot of the log of the alloy zone thickness obtained for increasing temperatures at 12 tons per sq in. and held 60 minutes in vacuum. The portion of the curve from 575° to 625°C is a straight line, obeying the Arrhenius equation. Calculation of the activation energy of the straight line portion of the curve shows it to be 15,500 calories per gram-atom.

Fig. 5 shows that in a sample reacted at 500°C and 12 tons per sq in., held for 60 minutes in vacuum, no alloy zone has visibly formed. The interface indicates some disturbance.

Forms Thick Alloy Zone—Fig. 6 shows the effect of a 50°C increase in temperature. The aluminum-iron zone formed is quite thick and composed of long, thin columnar grains.

Fig. 7 is a plot of alloy zone thickness versus increasing pressures at 525°C held 60 minutes in vacuum. From 4 to 8 tons per sq in., no alloy zone is visible; as pressure is increased to 20 a sharp rise in zone thickness is found. The alloy zone formed at 600°C for pressures ranging from 2 to 14 tons per sq in., shows an increase in thickness of from 16.2 to 18.4 x 10^{-3} cm.

The effect of pressure on intermetallic alloy zone formation is depicted in Fig. 8. A sample hot pressed at 525°C at 8 tons per sq in. and held for 60 minutes in vacuum shows a structure almost identical to that in Fig. 5. Increasing the pressure to 20 tons per sq in. under the same reaction conditions causes formation of the intermetallic alloy zone in Fig. 8.

Thickness Affects Tensile — Finally, Fig. 9 shows the interdependence of alloy zone thickness and ultimate tensile strength for samples reacted at 525°C for 60 minutes in vacuum. With increasing zone thickness, tensile strength declines. The same effect was observed for samples hot pressed at 600°C for 60 minutes in vacuum.

Of considerable interest in this particular study is the fact that with increasing reaction pressure the intermetallic alloy zone thickness increased. This is exactly the inverse of what was found for the aluminum-nickel system. Some recent work concerning the aluminum-copper system indicates that it also responds to increasing reaction pressure.

Enamel on Stainless: Combination for Strong Walls

Enamel has the color; stainless the rigidity.

Back up the stainless with aluminum honeycomb, and you have a light easy-to-install panel.

More than a facade, the paneling serves in many areas as the complete wall without masonry or other materials added.

■ A new architectural product is being introduced in the remodeling of a 12-story office building. It's a curtain wall panel of blue porcelain enamel on textured stainless steel.

Framed in mullions, the panels form spandrels the full width of the building. The producer, Seaporcel Metals, Inc., New York, points to the weatherability and low maintenance requirement of the panels.

Combine Properties—The union of stainless steel and enamel combines the properties of both materials. The stainless steel gives rigidity and flatness to the exterior surface. The easy-to-clean enamel has color stability and scratch resistance.

In sandwich form the new panels consists of three parts: an enameled stainless steel face sheet, an aluminum honeycomb core, and an electrogalvanized mild-steel backup sheet. The three are bonded together in compact units 3/8 in. thick.

The face sheets, 24-gage type 302 stainless steel, are textured by the supplier, Ardmore Co., Kenilworth, N. J. Texturing adds stiffness to the panel and improves appearance. It permits use of lighter gage material and saves both in sheet metal cost and cost of supporting members.

Prepare Surface — A sandblast etching stage insures adherence of the enamel. The sandblast unit operates at 100 lb pressure to prepare the tough stainless surface.

The porcelain enamel is sprayed on the prepared surface. The sprayed sheets then travel on a 200-ft chain conveyor system through an 85-ft-long, high-temperature furnace to fuse the enamel to the steel.

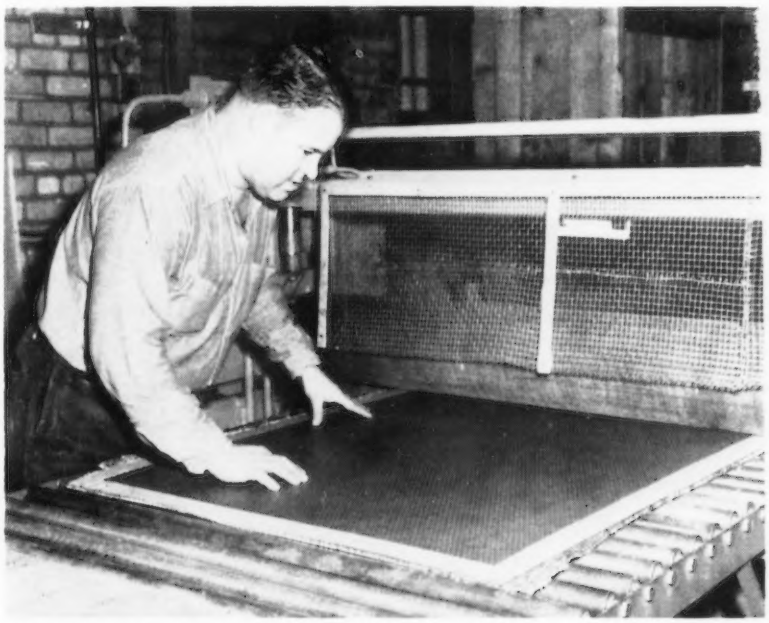
It's a furnace with three stages: Preheat for 25 ft; a full-fire zone at temperatures up to 1550°F for 35 ft; and a 25-ft cooling zone. Total furnace time is 4½ minutes.

Laminating Steps — One side of the backup sheet and one side of the aluminum honeycomb are sprayed with thermoplastic adhesive and passed under infra-red light at 200°F. The sprayed surfaces are pressed together.

Then the back side of the face sheet and the remaining exposed surface of the honeycomb get sprayed. The face sheet, pressed onto the honeycomb, is registered with the backup sheet to complete the sandwich.

A final high-pressure stage bonds the components and results in the rigid, uniformly flat panel. For large panels, Seaporcel handles the last step on a Bertelson hot-platen press, accommodating panels up to 5 by 10 ft. The press exerts laminating pressures up to 120 psi. Each panel, trimmed of excess honeycomb material, is framed by a subcontractor.

Installation is simple: Two men lower the panel (weight: 4 lb per sq ft) by hand onto a molding, resting it against the mullions. Pressure clips, spaced on 16-in. centers, lock into premachined keyways.



HIGH-PRESSURE STEP: Rollers exert pressure on three-piece sandwich to complete rigid, flat unit.

Diversity No Problem to Large Job Shop

By T. M. Rohan—Cleveland Regional Editor

Small lots, die changes, inventories, plus a score of other problems stand in the way of a job shop's efficiency.

Mix job shop techniques with those from a mass-production plant and the result is quite different.

▪ Mass production plants and job shops are generally horses of a different color. At Ford's Hardware Div. plant at Sandusky, O., the two have been cross bred with excellent results.

The plant turns out 700 different items at high rates for Ford's car and truck assembly plants across the country. Items include window parts, lamp housings, dashboard parts, seat tracks, door locks, and small die castings for operating parts.

What Makes It Click — Since opening day, the plant has been worked two shifts. Die changes are done overnight.

The first slitting line for the Hardware Div., a Yoder unit, has turned out 4.1 million lb monthly on an 8-hour shift. It handles up to 70 pct of all stamping tonnage in 60 different widths and is saving about 42¢ per cwt.

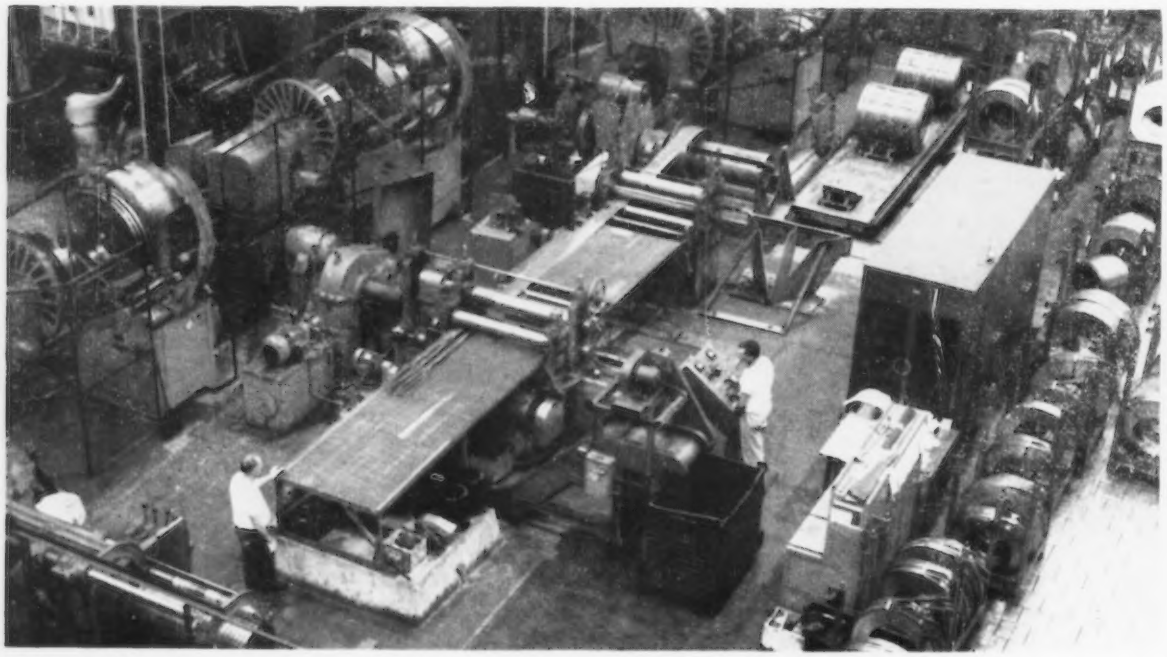
A 200-ft automated plating line puts a high quality finish on steel and zinc parts.

Commercial-quality steel is sent to tool and die vendors for die tryouts. Samples must be made from this grade of steel before the dies are accepted. Die design has been worked out so well for standard steels that only 50 to 90 tons of deep-drawing quality are needed monthly.

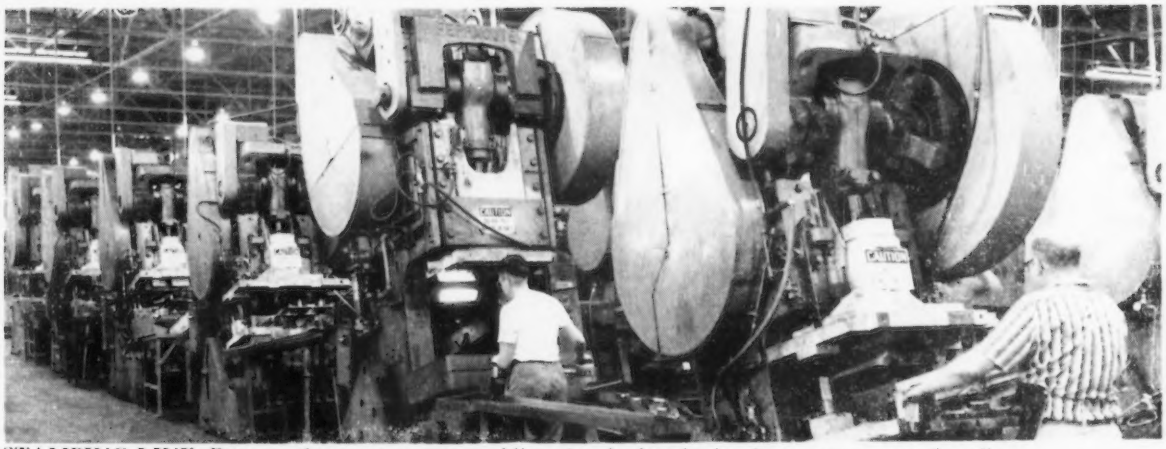
All steel is delivered by truck—60 pct of it coming from Ford mills. Frequently, it arrives the same day it has been rolled.

Glance at Volume — Hardware items consume about 40,000 tons of steel sheet per year. In addition, plated die castings take 7200 tons of zinc and nonplated parts require 4000 tons of aluminum.

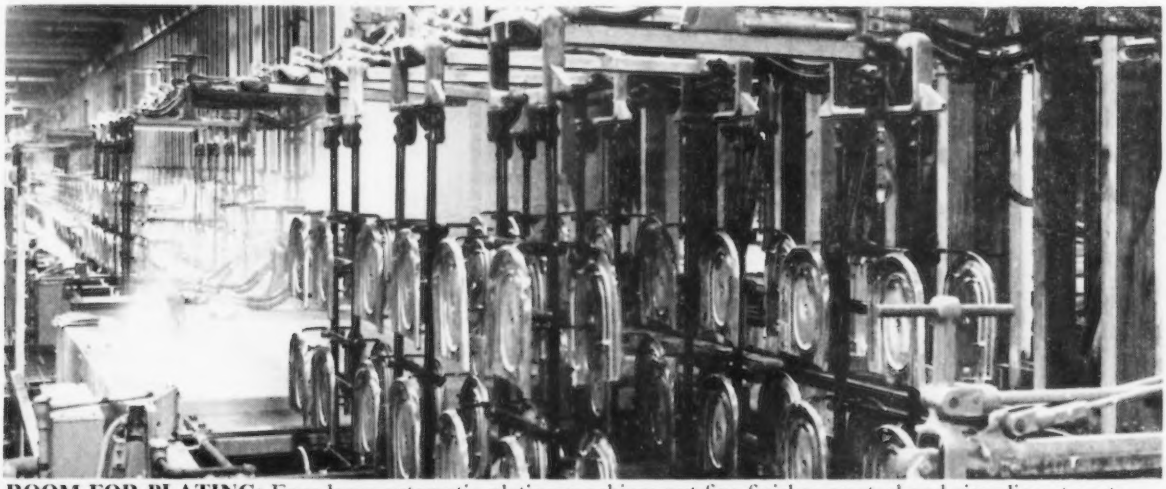
As many as five dies are used in a single press, the largest being a 1500-ton unit. Die changes during production shifts are few. Most changes are held over for the graveyard shift. Since inventories are kept low, mills are pressed for prompt delivery.



SLIT TO WIDTH: Production starts at slitting line where coil stock is cut into more than 60 widths.



STAMPING LINE: Battery of presses stamps moldings by the hundreds. Some presses use five dies.



ROOM FOR PLATING: Four large automatic plating machines put fine finishes on steel and zinc diecast parts.

FINISHING TOUCH: Operators use pneumatic tools to make fast work of Edsel tail light assemblies.

Form Thick Titanium Spheres by Hot Spinning

Developed originally as a way to make strong, lighter-weight gas containers for aircraft and missiles, this refined approach to hot spinning is gaining wide interest in the process industries as well.

It's cheaper than deep-drawing titanium pressure vessels to exacting standards, and easier to control.

▪ An improved process for hot-spinning thick titanium alloy hemispheres has been developed by Titanium Fabricators Inc., Burbank, Calif.

The new method evolved from a project aimed at making lighter-weight pressure vessels for missiles. A basic problem in such work is how to get the most gas into the lightest container. Until now, it's been met by using low strength, light weight materials like fibres, or heavy strong materials like steel.

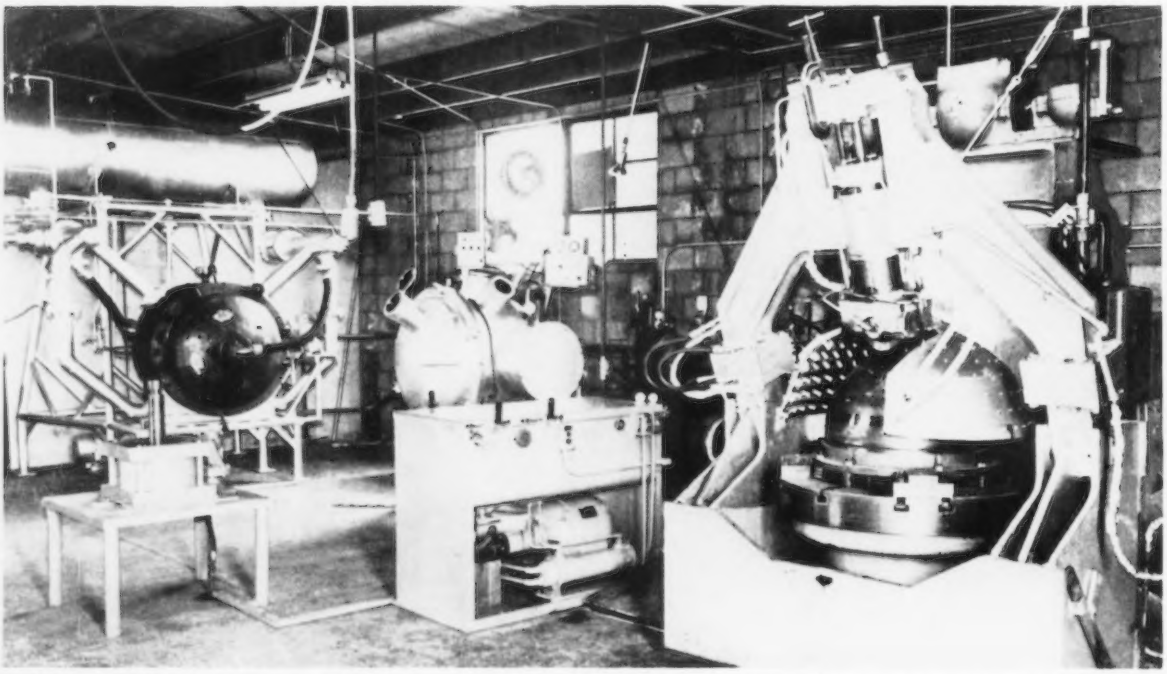
TIFAB approached the problem by making bottles of heat-treated titanium. The material used is 6A1 4V, a relatively new heat-treatable titanium alloy developed by the Army Ordnance Corps.

Hemispheres are made from circular blanks delivered in plate form from the mill. Blanks are preheated, then hot-spun. Spinning has proved cheaper and easier to control than deep drawing.

Builds Special Device—A vertical spinning machine was designed by TIFAB under the direction of Dr. Morris Asimow. Completely hydraulic, it has controllable feeds, speeds, and pressures. Accurate control is very important in hot forming titanium alloys, especially in this application.

TIFAB's machine is a special vertical spinning lathe frame with a floor-mounted table rotating in the horizontal plane. A specially designed hydraulic yoke moves up and down on an axis of the great circle of the hemisphere.

Titanium should be formed slowly and by high but controlled pressures. The TIFAB machine's hydraulic system is rated at 3000 psi and can exert as much as 12 tons of pressure on the small area being formed. The yoke is pulled up and down at any pre-set speed, and at any desired pressure. Hydraulic pressure actuates the cylinder on which the spinning wheel is mount-



SPECIAL TOOLS: Equipment designed by TIFAB includes the vacuum heat-treat and quenching chamber in left background, the inert-atmosphere weld chamber beside it, and the vertical spinning machine at right.

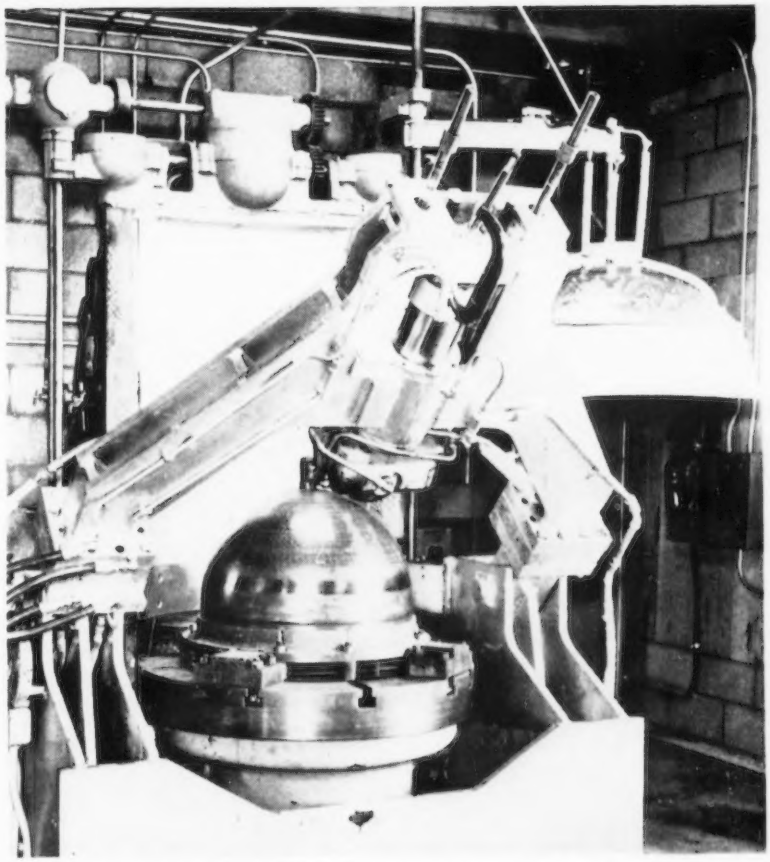
ed. Speed of the table can be varied and controlled.

Versatile Unit — The machine adapts to a variety of work. Where it's usually necessary to scarf or machine edges of hemispheres after final spinning, this is done by an easily mounted attachment. Thickness can be closely controlled during spinning. Contour machining is simply a matter of removing the spinning tool and attaching a machine tool.

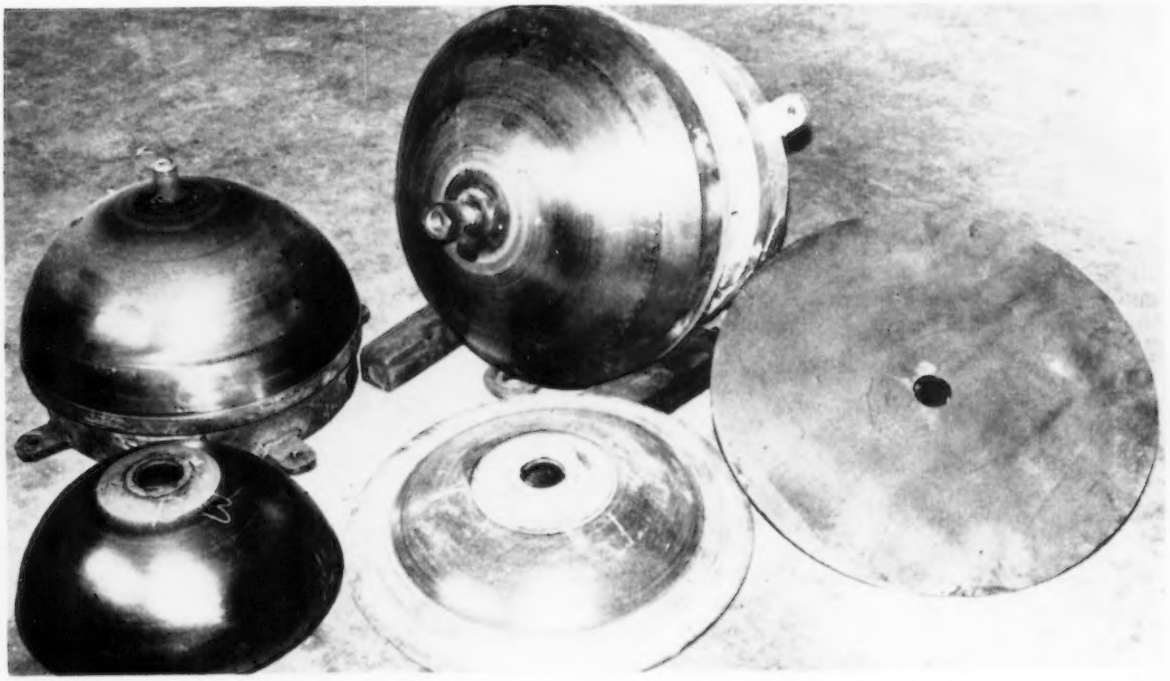
TIFAB also designed special welding machines for the job. The entire vessel is submerged in inert atmosphere to prevent contamination. Welding is semi-automatic.

To minimize heat-treat distortion, TIFAB uses a special vacuum chamber in which the vessel is placed at room temperature and heated. Water under pressure is then sprayed to hit all points on the vessel instantly and evenly.

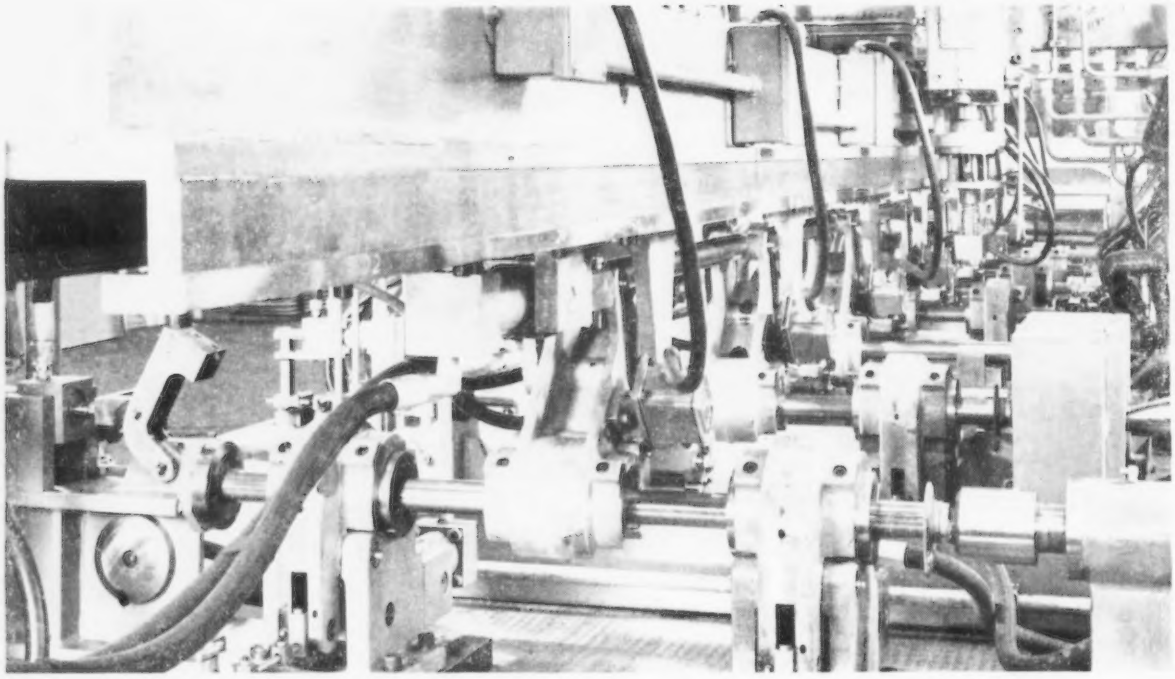
TIFAB says its methods of forming titanium are suitable for short or long runs and adaptable to prototype or experimental use. These practices are also believed to have wide potential beyond aircraft.



GREAT-CIRCLE ROUTE: Vertical spinning machine is all-hydraulic for close control, delivers up to 12 tons pressure at the forming tool.



THREE STAGES: Arranged in front of the forming dies are a completed hemisphere prior to welding and pickling, left, a partly shaped piece at center, and a titanium blank at right.



STANDARDIZED AUTOMATION: Modular concept duplicates transfer bars, fingers, and clamping fixtures.

Automated Line Adjusts Easily to Design Changes

By R. H. Eshelman—Engineering Editor

All automated setups aren't so specialized that they can't be altered when designs change.

This in-line machine was modified quickly and inexpensively, right on the production floor.

▪ When an automated setup must be modified for design changes, it's apt to be costly. Too often we assume that this is the nature of automation and nothing can be done about it. However, this is not necessarily the case. Often, with a little forethought at the time an automatic line is planned, provision can be made for relatively inexpensive changes.

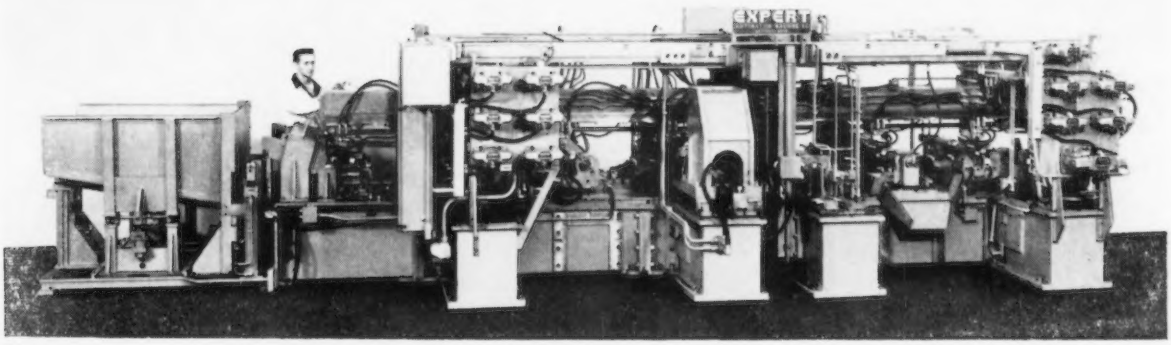
For instance, take a combination in-line machine developed by Expert Automation Machine Co., Detroit, Mich. Built to produce a certain type of flanged steel tube at high speed, it incorporated such diverse metalworking operations as welding, machining, assembling and testing.

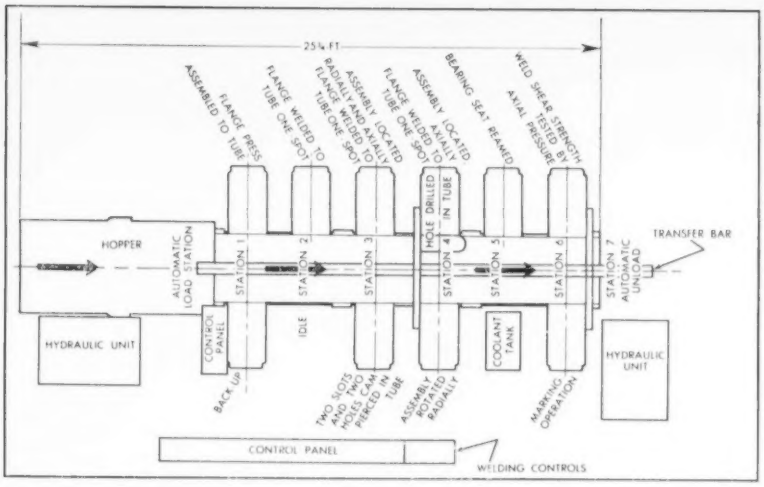
Shortly after the machine was completed and installed, however, some design changes were made in the tubular workpiece. The flange, which was originally welded to an end of the tube, had to be moved further down. Several holes in the opposite end of the tube were modified, also.

High Production — The operations originally performed by the machine included: (1) assembling and welding the flange to one end of the tube; (2) three separate machining jobs on the other end; (3) testing the finished assembly. All this was done at a rate of some 400 units per hour.

When the machine was first built, Expert Co. engineers collaborated with the user in making it flexible enough to handle possible part changes. They provided for wing bases at all idle stations to allow operations to be added or altered if necessary. They also provided fittings for extending the machine at the finish end.

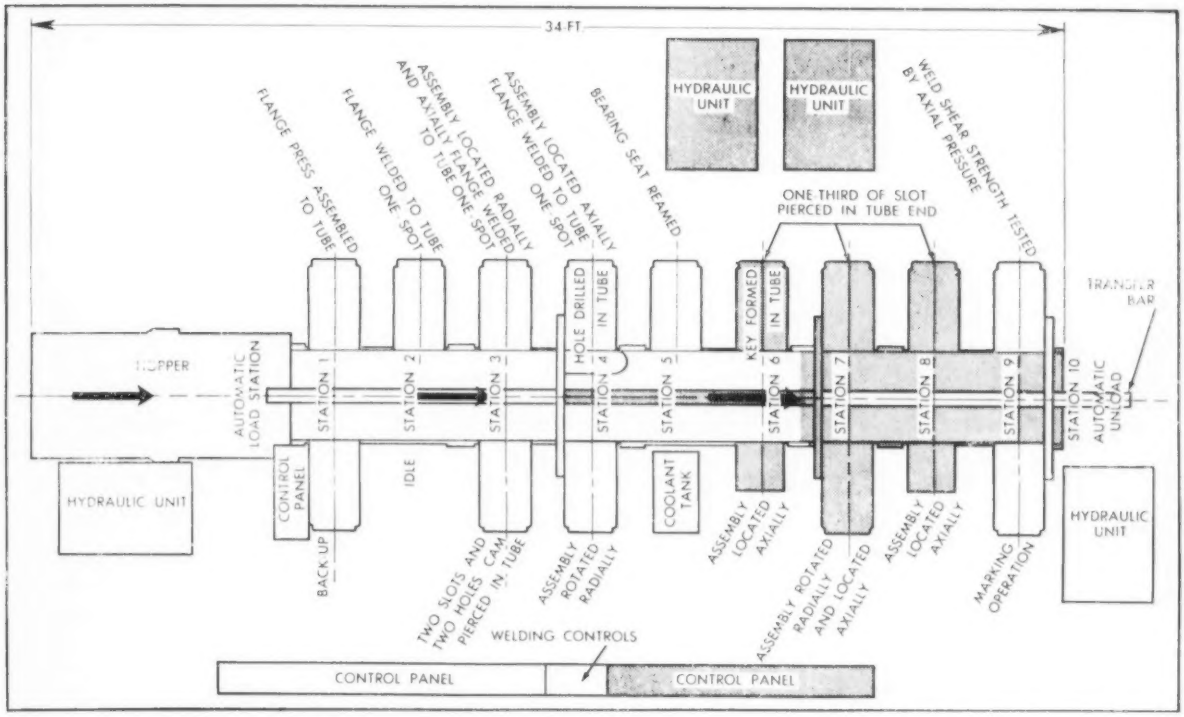
Standardization Helps — To carry out this concept, standardized dimensions were used at all stations





ABOVE: Original transfer machine shows finish machined bases at idle stations. These, plus the use of standardized table dimensions, simplified the addition of three more work stations when the tube-assembly design was revised.

LEFT: Initial in-line machine performed a number of machining and welding operations at its seven stations. Space-saving idea was the use of winged bases to permit working on assemblies from both sides of the unit.



EASY TO SEE: Three additional stations handle key-forming and slotting on the new tube assembly.

BEFORE AND AFTER: Old assembly (top) was redesigned to make the new style flanged tube (bottom).

for such things as table heights, widths, assembly holes and accessory openings. In addition, work holding fixtures were mounted on sub-plates so they could be changed or modified readily. Standardized clamping and work holding arrangements were also incorporated.

The original setup is shown in the accompanying diagram. At the head of the machine bundles of tubes are loaded into an inclined hopper. A selector plate feeds them through to the machine one at a time, and a feed magazine guides each tube to the pickup point of the transfer system.

Transfer Important—The transfer mechanism is the bar-type, using transfer fingers at each station to carry the part in an inverted U-path through the machine. The flange component of the assembly is manually loaded in a feed track which guides it into the first station.

In Station 1 the flange is oriented and hydraulically pressed onto one end of the tube. Location and orientation of the assembly is maintained during the transfer to the second station. Here the flange is spotwelded to the tube in a pinch-type operation.

The assembly is then relocated axially in Station 3, where four slots are pierced in one end of the tube and a second spotwelding operation is performed on the flanged end.

The tube is again relocated—radially this time—in Station 4. After it is clamped, a hole is drilled in one end and a third spotwelding operation is simultaneously performed on the flange end. Next, the flange end of the tube is reamed in Station 5. At Station 6 the assembly is tested by axial pressure on the flange.

Machine Modified — After several months of production, the product design was modified. To accommodate these changes, it was relatively simple to add three new stations and some accessories to the modular machine setup.

The first five stations were left intact. Now, however, Stations 6, 7 and 8 form a key in the tube and also pierce slots at one end in successive steps. The testing operation remains the same, but it is now done at Station 9.

Expert Co. engineers didn't expect such extensive product design changes when they built their modular machine. But they are pleased that their ideas have proved out: That automation flexibility needn't be expensive.

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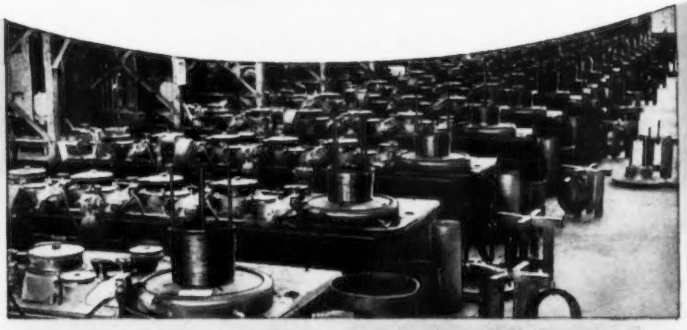

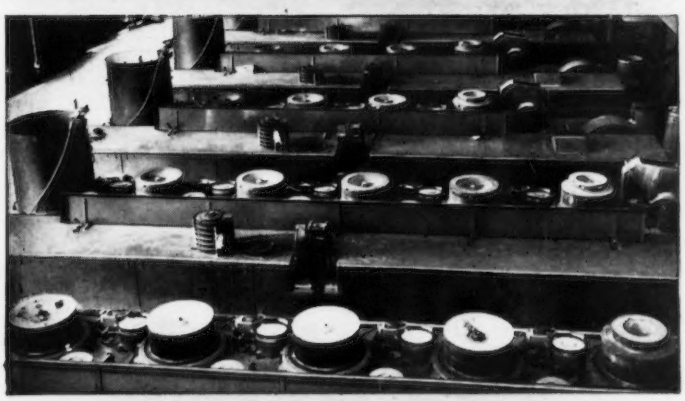

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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 153.

Collet Chucks

All types of tool room lathes, engine lathes and grinders can make use of speed collet chucks. So states a new bulletin. (Hardinge Brothers, Inc.)

For free copy circle No. 1 on postcard, p. 153

Motion Pictures

Sound-color motion pictures available on a free loan basis to organizations are listed in a booklet. It reviews 14 of them, which describe various aspects of mining, steelmaking and metalworking. (Colorado Fuel & Iron Corp.)

For free copy circle No. 2 on postcard, p. 153

Cutting Tools

Cutters and accessories of a large tool manufacturer are listed in a 96-page catalog. It covers the company's entire line of metal cutting tools, as well as arbors, adapters, collets, vises, index plates, work driving dogs, taper mandrels, expansion bushings, and spring chucks. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 3 on postcard, p. 153

Copying Equipment

An 8-page brochure describes XeroX copying equipment. It explains how the xerographic copying process works. A list of everyday uses and general duplicating requirements is included, suggesting improved means of cutting costs and speeding paperwork. (The Haloid Co.)

For free copy circle No. 4 on postcard, p. 153

Sheet Puncher

Optical pickup attachments for punching templates direct from drawings or printed master circuits are described in a data sheet. For use in making electronic printed circuit boards, the unit also has applications for punching complex hole patterns in any sheet material to a capacity of ¼-in. in mild steel. (Wales-Strippit Co.)

For free copy circle No. 5 on postcard, p. 153

Openhearth Design

Practical modernization of the lower portion of open hearth furnaces to increase furnace capacity is discussed in a folder. (Geo. P. Reintjes Co.)

For free copy circle No. 6 on postcard, p. 153

Cable Covering

Advantages of flame retardant polyethylene sheath for high-voltage power cables are mentioned in a bulletin. Rating, scope of use, conductor construction, insulations, and shielding of available sheathed cables are detailed. (Rome Cable Corp.)

For free copy circle No. 7 on postcard, p. 153

Screw Machining

A manufacturer of stainless steel fasteners is making available a new screw machine products brochure. It depicts typical screw machine

work in a variety of tough alloys including stainless steels, Inconel, nickel and titanium. (Allmetal Screw Products Co., Inc.)

For free copy circle No. 8 on postcard, p. 153

Hand Trucks

Load balanced design, all welded construction, and safety in handling are features of a company's new hand trucks. These handle loads from 300 to 800 lb. (Harper Steel & Supply, Inc.)

For free copy circle No. 9 on postcard, p. 153

Liquid Buffing

An automatically applied liquid buffing compound which saves buffing time and increases buff life up to 200 pct is described in a 4-page bulletin. (Hanson - Van Winkle-Munning Co.)

For free copy circle No. 10 on postcard, p. 153

Blind Rivets

For designers and engineers, a 16-page booklet gives data on internally threaded tubular rivets. These, it says, are the only one-piece blind rivets with internal threads. (B. F. Goodrich Co.)

For free copy circle No. 11 on postcard, p. 153

Porcelain Panels

Architectural porcelain enamel on steel and aluminum is the subject of a new 8-page bulletin. (Ingram-Richardson Mfg. Co.)

For free copy circle No. 12 on postcard, p. 153

Magnetic Handler

An illustrated bulletin tells about a magnetic means of carrying parts along on overhead conveyors. It eliminates clamps and hooks. (Multifinish Mfg. Co.)

For free copy circle No. 13 on postcard, p. 153

Welding Stainless

Seam welding of low-carbon and stainless steels is discussed in a bulletin. It contains charts, macrophotographs of welds, production photos and technical descriptions from material preparation to weld

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FREE LITERATURE

testing. The 16-page bulletin gives specific details on welding techniques. (The Taylor-Winfield Corp.)

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Cutoff Machines

Cutoff machines are featured in a folder. It also covers automatic loaders, hot-spinning machines and a safety drill table. (Modern Machine Tool Co.)

For free copy circle No. 15 on postcard, p. 153

Numerical Control

Numerical control of production parts in automated production-assembly lines through the use of an automatic marking machine is described in a 2-page bulletin. (New Method Steel Stamps, Inc.)

For free copy circle No. 16 on postcard, p. 153

Chain Oilers

Oilers that automatically apply a film of oil to chains, gears, slides or irregular surfaces are covered in a bulletin. These oilers can be mounted at any convenient location. They release oil by gravity from a reservoir either manually or electrically. (Trico Fuse Mfg. Co.)

For free copy circle No. 17 on postcard, p. 153

Cathetometer

Operation, applications and specifications of a coordinate cathetometer are reviewed in a data sheet. The cathetometer is an optical measuring instrument for horizontal and vertical measurements on objects in a vertical plane. (Gaertner Scientific Corp.)

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Heater Maintenance

Four pages of tips tell what to do and what not to do in installing and caring for unit heating equipment. (Air Moving and Conditioning Assn.)

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STEEL WAREHOUSE "TAKES TO THE AIR"

Fig. 1 — TRAK-RAK fork lift at top of column, lifting bundle of steel rod. Unit serves 3 long aisles of racks.

TRAK-RAK SYSTEM INCREASES STORAGE SPACE, SAVES 22% CAPITAL BUILDING INVESTMENT

When A. C. Leslie & Co. Limited, needed more storage area in its busy Toronto steel warehouse, it decided to "reach for the ceiling" with a Chicago Tramrail TRAK-RAK System of vertical storage and handling. As a result, the company estimates it not only saved 22% of projected capital building costs, but increased the overall efficiency and speed of the Toronto operation. The company expects to gain further economies as the TRAK-RAK system is used to its full extent.

A 5 ton capacity toprunning TRAK-RAK Crane was installed in each of two 40 ft. wide bays to serve specially designed 18 ft. high material storage racks (Fig. 1). Each crane bridge has an overhead trolley, from which is suspended an electrically operated rotating column

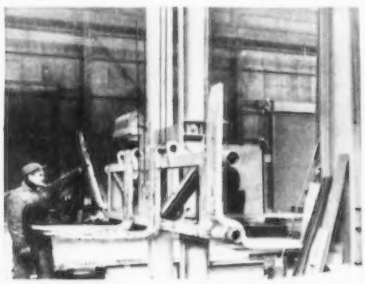


Fig. 2 — Carriage equipped with 2 pairs of forks. Operator is flopping outer forks up.

equipped with a special fork lift. All operations of the fork lift, which revolves to serve either side of the aisles, moves toward or away from the racks, and raises or lowers on the column, are controlled by the operator who rides with the carriage.

Two pairs of forks are mounted on the carriage. The outer forks may be flopped back (Fig. 2) leaving the inside forks in position for handling palletized or crated material. For handling long boxes, bars, etc., the outside forks are flipped back into working position.

A TRAK-RAK feature which added to handling speed and insured safe operation was the safety interlock switch system which prevents the column from running

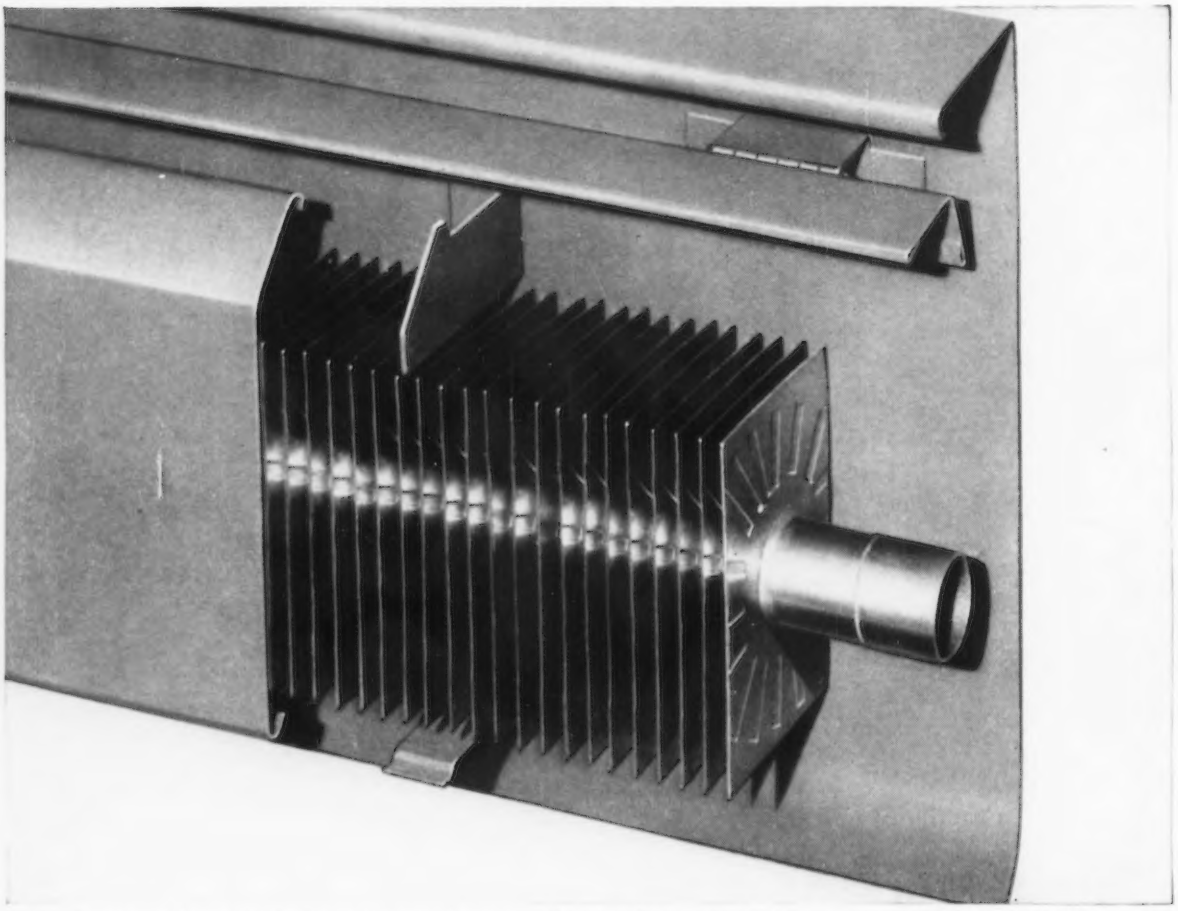
Fig. 3 — TRAK-RAK column requires minimum aisle space for operation.

into a rack and permits full rotation only when the unit is safely beyond the end of the racks.

The A. C. Leslie Company reports that a similar TRAK-RAK System installed in its Montreal warehouse permitted a 37% savings in capital building investment with equally good operating efficiency and economy.

For complete details on the TRAK-RAK System of vertical storage and handling, write the manufacturer:

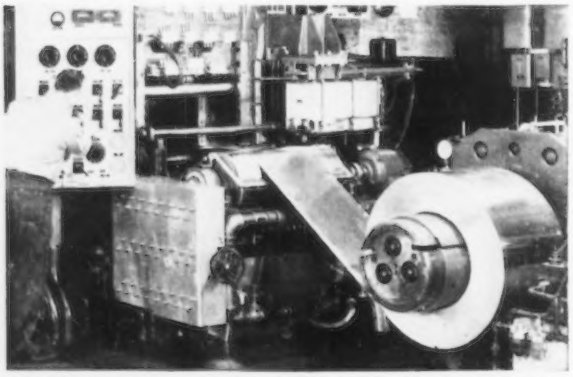
CHICAGO TRAMRAIL CORPORATION
1312 S. Kostner Avenue • Chicago 23, Ill.



A section of Rittling 750 baseboard radiation. Rittling uses Anaconda Aluminum Alloy 3003-H14, .025 gage in 4" and 4⅜" widths for fins.

"From past experience, we know we can count on American Brass for quality Aluminum Coiled Sheet."

The Rittling Corp., Buffalo, N. Y., manufacturer of baseboard and fin tube radiation for commercial, residential, and institutional applications has used Anaconda Copper Tube in their units for many years. Now they are using Anaconda Aluminum Coiled Sheet for the fins. "We can always count on The American Brass Company for a quality product," says Mr. Dan Moran, purchasing agent.



Available for prompt shipment to all points in the U. S.

Anaconda Aluminum Coiled Sheet in gages from 0.006" to 0.064" and in widths from ½" to 28", coils up to 100 pounds per inch of width, in alloys 1100, 3003, 3004, 5005, 5050, 5052

Rittling stamps the fins from large coils of aluminum sheet. Copper tubes are expanded into flanged holes in the fins to provide a tight, large-area contact for efficient heat transfer.

ALUMINUM COILED SHEET produced to the high standards of quality and uniformity maintained by The American Brass Company is now available for prompt shipment from our Torrington Division to all points in the United States.

It is rolled on the most modern, high-speed equipment, X-ray controlled to close tolerance in gage. High-speed, electronically operated slitters give exact widths with clean edges on evenly and tightly wound coils. Latest type annealing furnaces—with controlled atmosphere and temperature—provide high uniformity of metal structure to meet specified mechanical-property limits.

FOR IMMEDIATE ACTION, contact The American Brass Company's District Sales Office nearest you or The American Brass Company, Torrington Division, Torrington, Conn. 5738

ANACONDA®

ALUMINUM COILED SHEET

Made by The American Brass Company

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Precision Fasteners

One manufacturer's precision industrial fasteners is reviewed in a revised bulletin. (Standard Pressed Steel Co.)

For free copy circle No. 20 on postcard

Dies, Machinery

Dies and associated machinery are covered in a catalog. Included is data on square and hexagon shape drawing dies; round wire, bar, and tube drawing dies; rough mandrel nibs; rough cored heading die nibs; nail and tack tooling inserts; barbing laps; straight and button head perforators; wire puller jaw inserts; and die finishing equipment. (Firth Sterling, Inc.)

For free copy circle No. 21 on postcard

Alloyed Bars

An engineering report analyzes effects of copper, abnormally heavy drafts, furnace treatment and die practice on special steel bars. The 12-page paper discusses the chemistry of raw material used in the production of one maker's bars. It explains how controlled addition of copper gives an approximate 10 pct increase in machinability over bars without copper; 25 to 150 pct better tool life, and improved resistance to wear and corrosion. (La Salle Steel Co.)

For free copy circle No. 22 on postcard

Steam Treating

What effect does steam atmosphere heat treating have on high speed tool steel? How about effects on cast iron, powdered iron, structural steel, brasses and bronzes, aluminum, beryllium copper, etc? Answers to these questions appear in a catalog. (Leeds & Northrup Co.)

For free copy circle No. 23 on postcard

Power Steering

Company literature points out assets of power steering for pneumatic-tired industrial trucks. It comes with the firm's 3000, 4000 and 5000-lb capacity models. Power Steering can be installed at the factory or in the field. (Hyster Co.)

For free copy circle No. 24 on postcard

Hardness Testers

A bulletin describes four combination hardness testers. Each of these makes both regular and superficial Rockwell tests. (The Torsion Balance Co.)

For free copy circle No. 25 on postcard

Flexible Couplings

Geared flexible couplings are described in a 12-page publication. It covers couplings with maximum bores ranging up to 7-in. and ratings from 2½ to 572-hp per 100 rpm. (Link-Belt Co.)

For free copy circle No. 26 on postcard

Measures Speed

Four methods of measuring strip mill speed to 1/10 of 1 pct accuracy through use of a potentiometer recorder are described in a brochure. (General Electric Co.)

For free copy circle No. 27 on postcard

Welding Control

Non-synchronous resistance welding control is featured in a 12-page bulletin. It furnishes electrical and mechanical information on standard components of the control. (General Electric Co.)

For free copy circle No. 28 on postcard

Welded Steel Rings

Welded steel rings are subjects of an 8-page bulletin. Featured are basic phases of welded ring manu-

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FREE LITERATURE

facture, including bending, electronically-controlled welding, sizing, heat treating and X-ray inspection. (Edgewater Steel Co.)

For free copy circle No. 29 on postcard

Speed Reducers

Some 164 styles and sizes of double-reduction speed reducers in ratios ranging from 75:1 to 4900:1 are covered in a 20-page catalog. (Cone-Drive Gears Div., Michigan Tool Co.)

For free copy circle No. 30 on postcard

Protective Paper

Vapor rust - preventive paper available in both innerwrap and barrier wrap form is covered in a booklet. It contains a chart for simplified calculation of paper needs. (Ludlow Papers, Inc.)

For free copy circle No. 31 on postcard

Transformers

Power transformers are described in a 40-page booklet. (General Electric Co.)

For free copy circle No. 32 on postcard

Long-life Engines

Spark-ignition engines are introduced in an 8-page brochure. It points out a few of many possible applications for them (i.e., pipeline pumps, machinery power). One unique use involves powering a sewage treatment plant; the engines run on sewage gas, which is available free to the plant operators. (Caterpillar Tractor Co.)

For free copy circle No. 33 on postcard

Job Shop

An aircraft company is making available a 14-page brochure describing its products, services and facilities. (Solar Aircraft Co.)

For free copy circle No. 34 on postcard

Two-Way Radios

Two-way mobile radio equipment is featured in a 38-page brochure. It shows a wide range of items designed to fit individual needs based on present FCC rulings. (Communication Products Dept., General Electric Co.)

For free copy circle No. 35 on postcard

Powerplant Valves

Design, construction and testing of a high pressure - temperature globe type valve are discussed in a publication. (Edward Valves, Inc., of Rockwell Mfg. Co.)

For free copy circle No. 36 on postcard

Centrifugal Fans

Airfoil centrifugal fans are illustrated in a catalog. It describes efficiency and quietness of airfoil blading. Fans come up to 700,000 cfm and up to 16-¾-in. total pressure. (Westinghouse Electric Corp.)

For free copy circle No. 37 on postcard

Aluminum Bags

Multi-wall aluminum foil bags can replace steel drums in bulk shipping many products, suggests a brochure just published. It points out that 60 empty such bags, with filled capacity of 30,000-lb, can be stored in the space now occupied by one drum with only 400-lb capacity. (Reynolds Metals Co.)

For free copy circle No. 38 on postcard

Welding-cable Tools

Two catalog pages cover a pair of new welding cable tools. First is a ball-point cable splicer which splices cable in two minutes. The second is a cable plug which quickly and efficiently attaches whip cables to welding lead cables. (Tweco Products, Inc.)

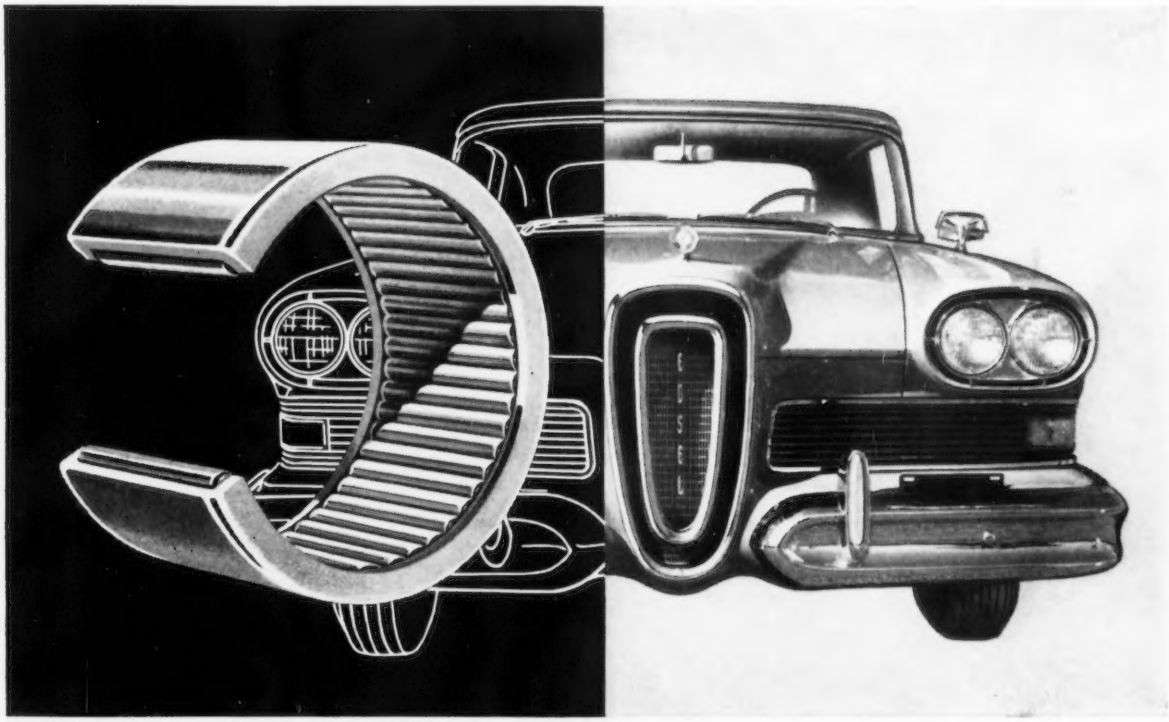
For free copy circle No. 39 on postcard

Quantograph

Described in a 6-page folder is a three-in-one analytical unit. It's a spectrograph, quantometer and monochromator in a single setup. (Applied Research Laboratories.)

For free copy circle No. 40 on postcard

America's newest thin-shell needle bearing



. . . now in America's newest automobile

Developed with the cooperation of Ford Motor Co., these KAYDON bearings are used in the automatic transmissions of Edsel as well as Ford and Mercury

The 1958 Edsel, America's newest automobile, backed by more than 1,250,000 road-test miles, employs in its transmission, America's newest thin-shell needle bearings, introduced by Kaydon of Muskegon. Why?

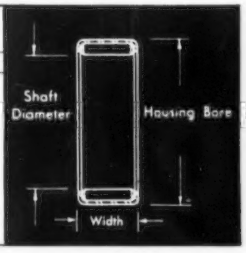
Proven in Ford-O-Matic and Merc-O-Matic transmissions, these Kaydon thin-shell needle bearings deliver 46% more bearing capacity.

Greater effective length of spherical end rollers does it. Important too, simplified construction, pre-packed lubrication, saves money . . . and saves valuable time on the assembly line too! See table below for standard Kaydon thin-shell needle bearing sizes.

AVAILABLE FROM STOCK IN 5 STANDARD SIZES:

SHAFT DIAMETER	HOUSING BORE	WIDTH
1.0605"	1.3130"	.500"
1.1250"	1.3755"	.750"
1.1250"	1.3755"	1.000"
1.1875"	1.5005"	.625"
1.3750"	1.6875"	.625"

For other sizes and complete specifications, write or call KAYDON of Muskegon today.



THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

K-573

All types of ball and roller bearings — 4" inside diameter bore to 160" outside diameter . . .

Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Needle Roller • Ball Radial • Ball Thrust Bearings

Grinds Complex Form In Aluminum Pistons

For some time, automakers have contour ground pistons for best efficiency. Such grinding generally is limited to a few set patterns.

Now, a major metals firm comes along with a grinder that makes possible working many shapes with the mere touch of a lever.

■ Automotive engineers for a large metals firm are now working with a newly created grinding machine. The grinder develops pistons with complex contours in the "skirt" area. This is the part that makes contact with the cylinder wall.

In use at the Cleveland works of Aluminum Co. of America, the selective grinder insures a closely conforming piston fit in auto engines.

Operator Effort About Nil — Pistons for many years have been contour ground for maximum efficiency. Such grinding was limited to but a few set patterns. This new development, though, makes possible infinite varieties of piston skirt shapes by merely touching a hydraulic lever on the machine.

Complex contour-ground piston skirts improve piston lubrication. They permit more oil to reach the critical skirt. This lets the part wear long and work quietly.

Precision Worker — The grinding machine is built to Alcoa specifications. It automatically shapes piston skirts so that "roundness" is altered within a 0.0002-in. tolerance to any contour desired. Once engineers determine the most efficient shape, they adjust the unit to reproduce the grinding on other pistons. Microscopic though the alterations may be, the effect on engine performance shows up.

Shaping of the piston skirt diameter varies at the most extreme dimensions by only 0.024 in.

Grinder technician checks a "tailor-made" piston job.

The head of a piston may be exposed to exhaust temperatures approaching 4000°F. So such skirt grinding performs a vital function by reducing friction.

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 153. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Automatic Controls Cut Forging Cost

Modernization is paying big dividends for a midwestern manufacturer of die-blocks and heavy steel forgings. Automatic control, added to 10 regenerative forge furnaces, is improving product quality, increasing hearth life, lowering fuel consumption and simplifing furnace operation.

Temperatures in each furnace at A. Finkl & Sons, Chicago, are sensed by three platinum-platinum rhodium thermocouples. One is in

These instruments control the furnaces' temperatures.

each side wall; a third is in the flue gas stack. A Leeds & Northrup single-point Speedomax recorder for each furnace measures and records these three temperatures as each of the thermocouples is switched into the circuit for a short period of time. Thermocouple sequencing is accomplished by a timer-operated selector switch, mounted outside of the recorder case.

Prevents Build-up — Control is based on the highest temperature measured by the recorder — the thermocouple signal from the hotter side of the furnace. When furnace refractories on this side reach a pre-set temperature (usually 2350 to 2400°F) a limit switch inside the instrument case automatically shuts off the heat. This prevents build-up of damaging temperature heads before the furnace is manually reversed.

TECHNICAL BRIEFS

Stack temperature is measured and recorded, but not controlled. This waste gas temperature measurement helps the operator balance fuel-air ratio for maximum combustion efficiency.

Lists Five Benefits — According to the company, the following benefits are direct results of the setup: (1) Product quality is up. Uniformity of temperature with no overheating results in fine grain size and little scale loss; (2) Hearth life is increased. Scale is easy to remove because the dry bottom conditions are maintained by limiting furnace temperature; (3) Fuel consumption is off. By referring to the stack temperature instrument, the operator can balance fuel-air ratio for optimum combustion efficiency; (4) The heater's job is simpler. The operator retains control of fuel-air ratio and of furnace reversal, but no longer needs to worry about building up damaging heat heads.

The firm turns out forgings weighing as much as 50,000 lb.

Stainless Steel Cases Protect Batteries

Storage batteries in jet aircraft take a beating. A wide range of temperatures and atmosphere changes challenge battery efficiency every instant when in flight. And the corrosion-resistant case containing them takes a pounding, too.

To meet such effects—and impact and vibration of aircraft—Sonotone Corp., Elmsford, N. Y., turns out batteries for the Air Force with stainless steel cases. Production tests put them through heat and cold from —65 to + 165°F.

Thin Metal Is Rugged—High strength stainless steel, supplied by Republic Steel Corp., Cleveland, permits the manufacturer to use light gage metal to withstand the impact and vibration. This helps keep weight of the power units down. A battery for an interceptor

plane weighs about 10 lb. For a bigger bomber, the power pack is about 160 lb.

Stainless, not needing any extra exterior protection, eliminates painting of the cases.

Cylinders Get Thicker

Wall thicknesses of pressure cylinders are getting thicker and thicker. According to U. S. Steel Corp., Pittsburgh, there is a growing demand for heavier than ½-in. walls common a few years ago. Reason for this is the need for

Inspector checks a 20-in. diam cylinder with calipers.

heavy wall cylinders for storing gases and chemicals under pressures as high as 10,000 psi.

National Tube Div. of the firm now produces such cylinders up to 30 in. in diameter. Length of these vary between 3 and 80 ft. Made from high alloy steels specially developed to withstand high pressures, some of the cylinders have walls 3-in. thick.

Improves Nylon Balls

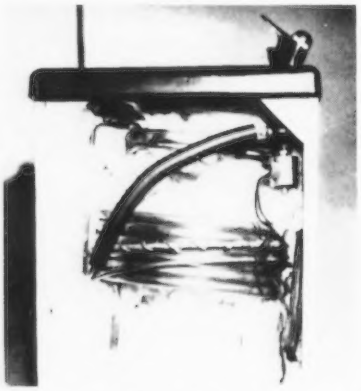
An improved method for manufacturing nylon ("Zytel" 101) balls has been claimed by Industrial Tectonics, Inc., Ann Arbor, Mich. These balls are formed by a true grinding process using a bonded abrasive wheel. During grinding an abundant supply of grit-free coolant prevents ball surfaces from becoming "loaded" with contaminating foreign particles.

Closed Cell Rubber Cuts Condensation

When cold water runs through tubing, moisture builds up on the tube. This condensation results in dripping, puddles, sometimes rust and corrosion in the area.

To solve such problems, one maker uses closed-cell rubber tube.

▪ Using closed-cell rubber solves a vexing insulation problem for a manufacturer of water-cooling drinking fountains. The problem, how to build a cooler that doesn't wet the floor beneath the unit, virtually disappeared when the maker switched to this new material. The non-absorbent product prevents condensation, dripping, and subsequent "puddling."



Cutaway view of cooler shows where rubber material is used.

The problem was especially apparent at two points in the fountain. These were the cold water line and the refrigeration line. Previously, open-cell sponge rubber was used. However, the firm, Uniflow Mfg. Co., Erie, Pa., discovered that this material dripped when it reached full absorbent capacity.

Use New Material — Several months ago, the company began using tubing of closed cellular rubber, a product of Rubatex Div. of Great American Industries, Inc., Bedford, Va.

The fountain builder now uses 12 in. of the tubing on the cold water line where the line passes close to the outside skin of the fountain after refrigeration. This insulation prevents sweating in the cabinet. On the refrigeration line 20 in. of closed-cellular tubing prevents condensation and resultant "puddling."

The structure of closed cellular rubber lends it its moisture resistant properties. Closed cellular rubber is composed of a myriad of tiny nitrogen filled cells each bounded by a rubber cell wall. Individual cells are impervious to water, moisture and vapor.

Metal Coating

Colorless as water, a new coating protects bare non-ferrous metals. It can also restore the color and gloss of faded paint or enamel films.

Developed by Magnus Chemical Company, Inc., Garwood, N. J.,

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 153. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

the material does not peel or turn yellow. It is a synthetic, high gloss polymeric finish, not a lacquer. Yet it dries in five minutes to touch and hard in 30 minutes.

Clad Strip

Precious metals permanently clad to inexpensive base metals are now available in precision-rolled strip from the American Silver Co., Flushing, N. Y. These metals include silver, gold, platinum and palladium.

Strip Coating

A new strip coating has been developed by Chemical Consulting Service, Milwaukee, Wis. It is a high solids, milky colored, plastic emulsion. When dry it gives a transparent, tough film for protecting smooth and wrinkled metal finishes, stainless steel, polished aluminum, plastic, marble and glass surfaces.

The material is applied by brush or spray gun. It becomes transparent as it dries. The dried film is permanently flexible and easily strips to preserve that factory-fresh appearance on the protected surface.

Silver-plates Aluminum

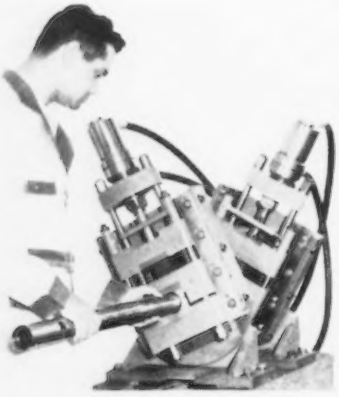
Silver-plated aluminum bus conductors for electrical installations are being made by a new method.

Developed by Reynolds Metals Co., Louisville, the process turns out conductors with flawless adhesion between the silver plating and the base aluminum metal. In addition, the company reports, the end product resists abrasion very well and is nonporous. Applicable to all aluminum alloys used for bus bars, the method is comparatively inexpensive, the firm says.

Silver plating bus bars lets workers make connections by relatively simple soldering and brazing techniques. Until now, some contractors and manufacturers preferred other products because of the high cost in making bolted joints.

New Production Ideas

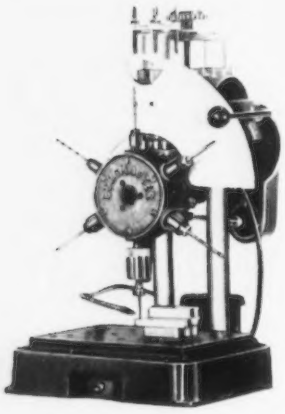
Equipment, Methods and Services



Machine Pierces Up To 600 Tubes Per Hour

This machine pierces round and/or irregular shaped holes in tubing at production speeds to 600 tubes an hour. Absolute control and support of the tubing during piercing assures an accurate job. As the punch engages the work, upper and lower compression inserts hold the tube and mandrel in a rigid balanced condition. Automatic release of the tube from the mandrel permits ease and speed of loading and unloading by a single operator. All working parts of the unit are immediately interchangeable. This enables speedy tooling for changes or new production parts. The machine is handy where parts are made in limited quantities while requiring frequent tooling changes. Simultaneous piercing of two or more holes is possible by using multiple heads. (Koppy Tool & Die Co.)

For more data circle No. 41 on postcard, p. 153



Bench Turret Unit Drills, Taps Small Items

Small, delicate parts can be worked safely by this machine. It's an auto-indexing, sensitive, 3/16-in. capacity turret drill. For bench use, the unit performs many secondary operations on such accurate parts. It drills, taps, reams, counterbores, countersinks, and spotfaces. And one operator can do all these jobs without moving the workpiece. Over-all dimensions of the turret machine are: 24 high x 17 wide x 20 in. deep. Its machined pad is 8 x 12 in. Base is 16 x 14¼ in. The unit is powered by a ¼-hp motor. Two columns on which the turret head is mounted easily adjust to convenient height. Center of spindle to the column clearance is 5¼ in. Chuck to base clearance is 7¼. A two-step timing belt drive provides 12 speed ranges; high range is 650 to 6200 rpm; low range, 350 to 3300 rpm. (Berg Tool Mfg. Co.)

For more data circle No. 42 on postcard, p. 153

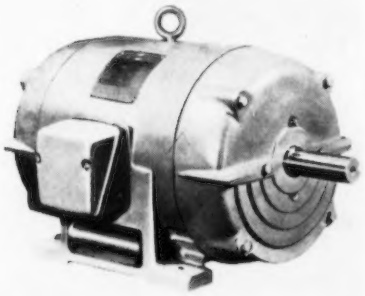
Circuit Breakers Are Easy to Use, Service

Simplified operation and servicing are key advantages of this completely redesigned circuit breaker and switchgear setup. The new circuit breakers come in 600-v units in 225, 600 and 1600-amp frame sizes. They feature quick-make manual closure of breaker contacts. Weighing some 55 pct less than older models, the breakers are about one-third smaller. Using a new motor-driven, stored energy system for electric breaker closure, they allow easily interchange of overload trips and ready access to trips and other breaker parts. The switchgear, with an extremely small frontal area, has a closed door, draw out design. Thus, breakers can be moved from operating to test and disconnect positions within their enclosure without opening switchgear cabinet doors. Reduction in breaker size permits four-high stacking of 600-amp units in standard 90-in. high enclosures. (I-T-E Circuit Breaker Co.)

For more data circle No. 43 on postcard, p. 153

Synchronous Motor

This synchronous induction motor is built in the same NEMA frame size as a standard motor of equal horsepower. It accelerates as an induction motor but runs at exact synchronous speed without permanent magnets or direct-current excitation involving collector rings and brushes, wound rotating fields, etc. Exceptionally compact, the ac motor offers very high power and efficiency. It is suitable for use



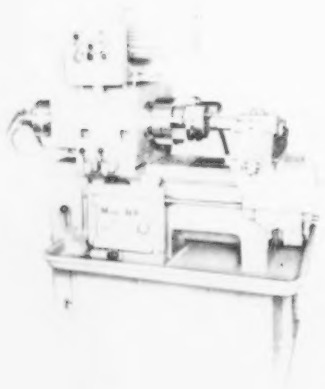
on many applications requiring constant speed with varying load. The motor can be used for constant speed drives on machine tools, wire-drawing machines, etc. As a conveyor drive, the motor makes possible exact constant-speed or adjustable-speed system for no-load to full-load conditions with a minimum of driving units and controls. It comes in 1 to 100 HP models in any enclosure type. (Louis Allis Co.)

For more data circle No. 44 on postcard, p. 153

Measuring Rods

Highly accurate end measuring rods for use with jig borers and other machine tools hold spacings and table settings to a high degree of precision. These rods come in 1, 2, 3, 4, 5, 6, 7, 8, 10, 12 and 15-in. sizes (also in Metric). They may be purchased in standard sets or in any combination of sizes to suit specific requirements. Also available are two micrometer heads, each of 4 to 5-in. range, graduated to read in ten-thousandths of an inch (or hundredths of a mm.). (L. S. Starrett Co.)

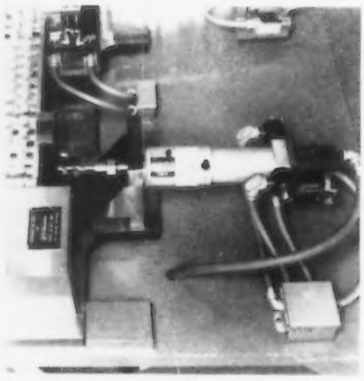
For more data circle No. 45 on postcard, p. 153



Precision Borer Uses One, More Spindles

This precision boring machine is available with either one or more precision spindles mounted independently on a fixed bridge. The spindles may be driven by separate precision balanced motors when different spindle speeds are necessary. They may also use a single motor with tandem drive. All boring spindles are precision ball bearing preloaded and V-belt driven. Three different types of spindles are available: A low speed spindle for speeds up to 2500 rpm, a medium speed spindle for speeds to 5000 rpm, and a high speed spindle for speeds up to 10,000 rpm. The headstock bridge design permits installation of other makes of standardized boring heads. Such an arrangement could keep maintenance costs down. The table or platen is mounted on a "V" and a flat way with extremely long bearings. (Seneca Falls Machine Co.)

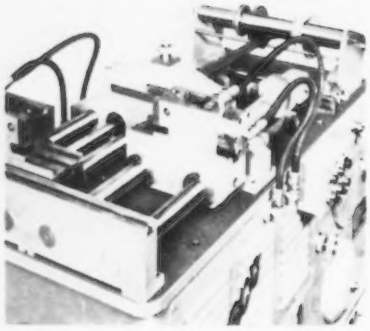
For more data circle No. 46 on postcard, p. 153



Automatic Drilling Speeds Parts Production

Now in use by an auto parts maker, this unit drills and countersinks six holes in right and left hand diecast radiator grilles at high production rates. Due to the required close spacing of two sets of holes and the large drill unit housing needed, indexing of the grille workpiece is necessary. Two remaining holes are spaced differently and are serviced by individual drill units. A panel of 18 relays working with 12 signalling limit switches controls automatic indexing selection. The push-button control panel includes start and stop, and three-position (off, manual, automatic) switches. Separate push button switches individually operate each drill unit, index the slide, or actuate the clamp. (J. C. Thompson Tool & Die, Inc.)

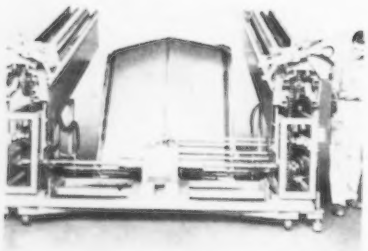
For more data circle No. 47 on postcard, p. 153



Twin-cylinder Unit Feeds Pressroom Setups

Hydraulically operated, this twin-cylinder gripper unit feeds pressroom equipment. Self-contained, it moves readily from one press to another. Compact design and rugged construction are key features. The twin-feeder takes up comparatively little floor space. It'll attach to a press, feeding from right, left front or back. And it can be timed to feed-in during any pre-selected portion of the press cycle. Its four legs are adjustable for easy leveling. The unit features an unusual cross-head arrangement which consists of two grippers, each operated by a hydraulic feed cylinder. Cross-head cylinders are sequenced effectively. (Sesco, Inc.)

For more data circle No. 48 on postcard, p. 153



Portable Unloader Handles Big Stampings

Extra large stampings can now be unloaded from presses by this portable unit. The plug-in, packaged unloader features two standard mechanical jaw assemblies mounted on individual carriages. A reversible air motor through a roller chain drive advances and retracts these carriages. Jaw assemblies mount on the carriages at a 45° angle; thus, they automatically clear the stamping when it's unloaded from the press. The unloader unit is highly flexible; it adjusts to handle a wide variety of large parts. Jaw assemblies swivel in any plane for universal adjustment. (Press Automation Systems, Inc.)

For more data circle No. 49 on postcard, p. 153

Thread-cutting Screw

This thread-cutting screw provides plenty of stripping torque on sheet metal jobs or other thread-cutting screw applications. Its maker recommends it for applications that have little screw-thread engagement. "Nibs" or protrusions under the head act as the brake, so

that the head rather than the threads take up the tightening torque. This permits a broad range of driver settings and reduced rework and rejections. Sizes available are No. 4 through ¼ in. with pan, truss, and hexagon washer heads. (Shakeproof Div., Illinois Tool Works.)

For more data circle No. 50 on postcard, p. 153

Fire Extinguisher

A new 3-lb capacity dry powder fire extinguisher has an Underwriters' Laboratories listing. It also has an extinguishing efficiency rating equal to eight 1-qt vaporizing liquid (carbon tetrachloride) extinguishers, says its maker. The small extinguisher measures only 17½ in. high by 4¾ in. in diam. It weights 8 lb fully charged. Pressurized with 130-psi nitrogen, it is charged with especially treated bicarbonate of soda, free-flowing, non-caking, non-toxic and non-abrasive. It can be recharged at any of the company's 1800 service units across the country or at any other qualified extinguisher service point. The one-piece spun steel cylinder meets ICC standards and is hydrostatically tested for 800 lb with a rupture point of 3000 lb. All working parts are brass or

bronze. The pressure gage is marked for instant check on its operable condition; any unreported use is signaled before the emergency of a fire. (Safety First Products Corp.)

For more data circle No. 51 on postcard, p. 153

Long Lathe

The most recent addition to one maker's line of lathes is a machine for turning large diameters and odd-shaped workpieces. It swings 60 in. over the ways and 49 in. over the cross-slide. The headstock is driven by a 40-hp motor. It has 24 spindle speeds in true geometric progression. These range from 6 to 750 rpm, with 3 to 375 rpm alternate, forward or reverse. Two levers control all 24 speeds. (Axelson Mfg. Co.)

For more data circle No. 52 on postcard, p. 153

Carbide Reamers

Solid carbide chucking reamers in a new series total 21 tools. They range in diameters from 1/16 to 3/8 in. Available from stock in fractional sizes, these reamers come in 1/16 through 1/4 in. They are four flute tools. From 17/64 through 3/8 in. are six flute tools. Reamers are manufactured to close tolerances. (Reamer diameter: +0.0002 —0.0000 in.; shank diameter: +0.0005 —0.0005 in. (Atrax Co.)

For more data circle No. 53 on postcard, p. 153

Belt-Conveyor Scales

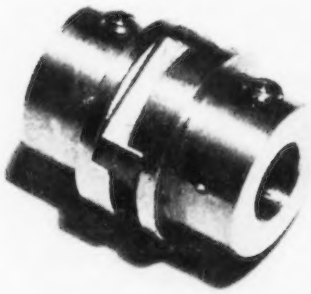
For weighing, controlling, and totalizing free-flowing bulk materials, a redesigned line of belt conveyor scales utilize mechanical linkages in both weight measuring and registering systems. These minimize and simplify maintenance. The belt scales are built to an accuracy of 1/2 to 1 pct of flow over their entire weight range. Units are available for any belt width, and are built from standard components. Any capacity is available, to suit the capacity of the line in

question. The scale housing is fabricated from dust-sealed aluminum, with neoprene sponge seals. A full-opening door with three-quarter size window affords good visibility. It also permits easy access for setting, routine checking and maintenance. Its gear box drive incorporates sealed-for-life bearings. The gear box itself is sealed, too. Self-cleaning v-rail construction is used for the integrator mechanism. The base of the scale is of rigid, jig-welded steel. (ABC's Scale Div., McDowell Co., Inc.)

For more data circle No. 54 on postcard, p. 153

Precision Coupling

Miniature precision couplings now available are of stainless steel with a nylon center block. They also



come with an oil-less center block. They are available in pin type and clamp type hubs in bore sizes of 1/8 to 1/4 in. diam. (PIC Design Corp.)

For more data circle No. 55 on postcard, p. 153

Drill Presses

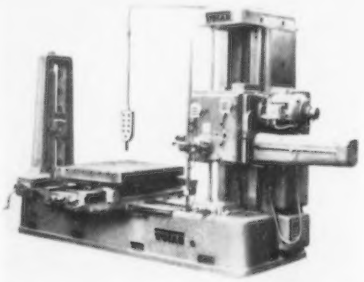
High speed automatic cycling drill presses in a new line have spindle speeds, feed range, stroke, feed stroke and rapid approach which are infinitely variable. They employ drill heads which provide complete automatic cycling with fast approach and fast return for drilling or tapping and positive stop with adjustable time delay for such operations as spot facing, counterboring, etc. These drill presses come in single or multiple spindle models. Each spindle has an individual control station. The variable speed drive provides infinitely variable spindle speeds

with maximum spindle speed of 8000 rpm available on the standard machines. (Secrest Machine Co.)

For more data circle No. 56 on postcard, p. 153

Boring Mill

This 3⅜-in. precision horizontal boring mill can be used both in tool-rooms and on the production line. It features: a power operated rotary table; a nitrided rolled bearing spindle; electro-magnetic clutches; rapid power traverse throughout; a threading attachment; centralized lubrication and controls.



The unit has a vertical capacity of 36 in. Spindle to outboard support is 86 in. speeds to 1000 rpm are standard. The boring mill spindle diameter is 3⅜ in. Taper in spindle is Morse No. 5. Working surface of table is 38½ x 41¾ in. Maximum distance spindle sleeve to boring stay is 87 in. (Index Industrial Corp.)

For more data circle No. 57 on postcard, p. 153

Four-Way Valve

A new four-way slide valve actuates a variety of air powered mechanisms and equipment. Designed with interlock switch and manual set-up control, it can be used effectively to obtain reciprocating action of double-acting cylinders with either long or short stroke. It can control more than one mechanism. Outside dimensions are 3 x 2 x 6⅞-in. high, including the solenoid pilot valve. (Dixon Automatic Tool, Inc.)

For more data circle No. 58 on postcard, p. 153

Toolholders

New Carboloy toolholders feature a one-piece chipbreaker-clamp that functions automatically. The toolholders also include a clamp screw accessible from top or bottom and a clamp color coding for quick identification. Other innovations provide a unique carbide surfaced chipbreaker that elimi-

nates braze failure, a high-strength heat-treated shank, a solid carbide insert seat, only five replacement parts and a smooth, unobstructed chip flow. To satisfy a wide range of operating conditions, standard clamps come in chipbreaker widths for light cuts, medium cuts and heavy cuts. (Metallurgical Products Dept., General Electric Co.)

For more data circle No. 59 on postcard, p. 153

Compressor

Truck mounted and thus very portable, a new 125-cfm rotary compressor is driven direct from the truck engine through a heavy duty power take-off. The latter eliminates need for a separate driving engine. The compressor can be mounted directly on the truck chassis or on a platform base. It is adaptable to any type of truck body. The compressor is of the multi-stage rotary type with a single free-floating rotor. It is 39-in. long and occupies less than one-third of the truck body space, leaving the remainder for men, tools and materials. Width is 35 in. and height, 41 in. Including the take-off, weight is 915 lb. (Davey Compressor Co.)

For more data circle No. 60 on postcard, p. 153

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The Iron Age Summary

Steel Use Will Set New Record

Falling ingot rate makes steel market look worse than it really is.

Steel use this year will set an all-time record of 84 million finished tons.

■ The steel market is a lot better than it seems. Actual steel use will set an all-time record of 84 million finished tons this year. This is often lost sight of in the face of steel's falling ingot rate.

No one in steel is trying to cover up the drop in new orders. And everyone agrees that steel users will go on living off their inventories until there is a definite reversal of the present trend. This may not come until the second quarter of 1958, or even later.

1958 Outlook—But steel is being chewed up in metalworking plants at a terrific rate. And unless there is a sharper downturn in the overall economy than appears in the cards, this rate of use will continue for some months. Predictions for 1958 indicate that steel consumption will be in the area of 80 to 84 million tons.

What's hurting the steel business at the moment is that more steel is coming out of users' inventories—less from the mills themselves. This has caused one of the most competitive markets for most steel products than at any time in recent years. But once these inventories have been cut back to "normal," steel output will move up into line with actual consumption.

Holiday Letdown — Incoming steel orders have picked up slightly during the last week. But this is not considered a reversal of the downtrend. Orders in recent months have tended to be up one week, down the next as steel users adjusted their stocks to avoid shortages of various sizes and gages.

Longer-than-usual holiday shutdowns of metalworking plants will depress the steel operating rate still further this month and next. For instance: Some appliance plants in the South Ohio River area are shutting down the remainder of the week after both Christmas and New Years. This is resulting in reduced ordering for December delivery, or setbacks into January.

Tax Angle—Steel users also are holding down year-end orders for tax reasons. Some local governments impose a tax on inventory on hand at the end of the year. This has prompted many smaller companies to cut inventories to the bone, while larger outfits have at least been discouraged against rebuilding inventories.

Steel scrap prices weakened further in some areas this week. Mill disinterest in new buys is depressing the market. At the same time, prices could rebound from present lows should the mills come in for bigger tonnages. Only small lots will move at present prices.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,843	1,843	1,997	2,474
Ingot Index				
(1947-1949=100)	114.7	114.7	124.3	154.0
Operating Rates				
Chicago	74.0	73.0*	78.5	100.0
Pittsburgh	75.0	73.0*	81.0	97.0
Philadelphia		85.0	87.0	105.0
Valley	66.0	68.0*	64.0	100.0
West	85.0	84.0*	80.0	100.0
Buffalo	63.5	78.0*	99.0	105.0
Cleveland	70.0	66.0*	85.0	107.0
Detroit	87.0	86.0*	92.0	106.0
S. Ohio River	73.0	82.0*	83.0	97.0
South	61.5	60.5	67.0	94.0
Upper Ohio R.	62.5	63.0*	74.5	105.0
St. Louis	76.0	87.0*	91.0	105.0
Northeast	40.0	40.0	40.0	100.0
Aggregate	72.0	72.0	78.0	100.5

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.622
Pig Iron (Gross ton)	$66.42	$66.42	$66.42	$63.04
Scrap, No. 1 hvy (Gross ton)	$32.00	$32.33	$33.33	$65.17
No. 2 bundles	$24.00	$24.33	$25.00	$52.83
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	27.00	27.00	27.00	40.00
Lead, St. Louis	12.80	13.30	13.30	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin Straits, N. Y.	90.25	87.25	89.625	110.50
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

Lightweight Trend in Hand Tools

New power tools are aimed at reducing production line worker fatigue.

Prices are levelling off generally. And most orders can be filled immediately.

■ Industrial hand tool prices have reached a plateau. Price increases which during the past year ranged from 1 to 10 pct have been headed off by a definite drop in sales within the past month.

Whatever pressure there may be for higher prices in the near future will probably be felt at the distributor level for those lines not sold directly by the manufacturer. At least one large producer of electric power tools expects to hold the retail price line while lowering wholesale discounts.

A Record Year—Even with the prospect of a year-end slowdown, 1957 is expected to be the best year on record for the hand power tool industry.

The Black & Decker Mfg. Co., which accounts for about 25 pct of all portable electric tool sales in the U. S., saw its net sales increase from $49.8 million in 1956 to $52.4 million this year—a rise of slightly over 4 pct. Optimistically, Black & Decker is budgeting 1958 sales approximately 9 pct over 1957.

October Downturn—Thor Power Tool Co. reports last year's sales were a record $28.4 million. For the first half of 1957, sales totaled $15 million. President Neil C. Hurley, Jr., feels that total sales this year will run "a bit ahead of last year."

One medium-sized eastern producer of high quality air and electric tools reports the first nine months of 1957 as 10 to 15 pct ahead of the same period last year. A downturn was noticed in October, however, and appears to be continuing.

Nowhere are there any reports of delivery problems for hand tools. Most items are available off-the-shelf. A week's delay can be expected for some special application tools.

First Shop Around — The portable power tool industry is still young and growing. The 60-odd companies that make up the industry are kept on their toes by vigorous competition.

A buyer should check the market carefully before going ahead with a purchase. Design improvements are going on constantly. Each year sees scores of new tools and accessories. A major trend is toward lightweight, heavy duty equipment designed to lessen production personnel fatigue rate.

New Products — Thor, for instance, recently introduced its lightest, most compact and powerful industrial air impact wrench, the 024. Other new models include the EPU "featherweight" impact wrench, and a 3-in-1 speed drill Model 20, designed for both home and shop use. It has integrally-mounted attachments for reciprocating jigsawing, sanding, and polishing.

Black & Decker introduced 13 new products in the past year. Ten were in the industrial-automotive line and three are entirely new categories. Included are a 1¼-in. magnetic drill press (see p. 91), a 1 hp router, and a nibbler. The nibbler is useful for precision sheet metal cutting, in template making or ductwork.

IT TAKES TOOLS: Assembly line workers at Black & Decker Mfg. Co. plant, Hampstead, Md., use hand power tools to assemble hand power tools. Shown are a ¼-in. drill line, left, and a portable saw line, right.

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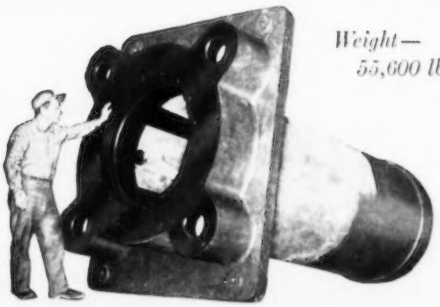

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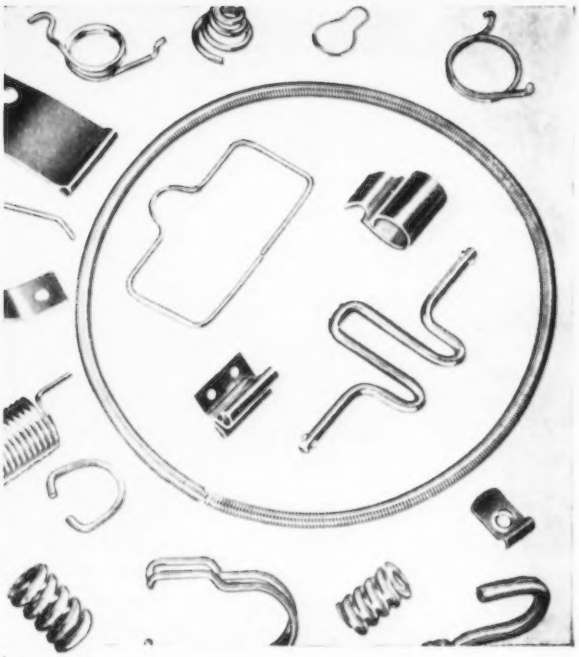

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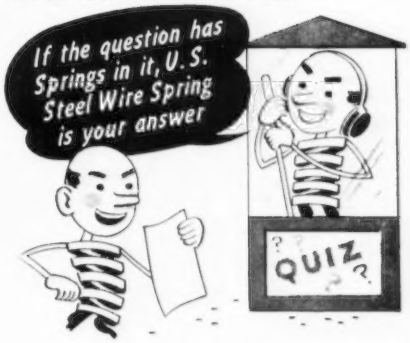

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STEEL PRODUCT MARKETS

Western Warehouse Prices Tumble

Distributors in Los Angeles area cut prices on sheet, strip, bar, plate, and structurals from $15 to $35 a ton.

In another move U. S. Steel Export reduces base prices on seamless pipe.

▪ Warehouse prices in the Los Angeles area have tumbled sharply —from $15 to $35 a ton—in the first major steel price reduction.

The drop—initiated by smaller outlets and followed by the major ones—affects hot-rolled sheet and strip, hot-rolled and cold-finished bar, plate, and standard structurals.

New prices (see p. 187) brought a reduction in hot-rolled sheet, strip, and plate of $35 per ton. Hot-rolled bar declined $33 per ton, while cold-finished bar fell $15 a ton. Standard structurals are down by $25 per ton.

Some products remain unchanged. They include galvanized and cold-rolled sheet as well as alloy, stainless, and tool steels.

Move Could Spread—The downward movement in prices was started by Earle M. Jorgenson Company. Others making similar adjustments included the Los Angeles outlets of Joseph T. Ryerson & Son, Inc., and the U. S. Steel Supply Div. of U. S. Steel Corp. Another firm announcing price reductions was Ducommun Metals & Supply Co.

Warehouse prices in other West Coast cities—including San Francisco, Portland, and Seattle—will probably be affected by the changes at Los Angeles.

Export Pipe Price Reduced—U. S. Steel Export Co., effective Nov. 26, reduced export price bases on 2 to 6 in. black and galvanized seamless pipe by $1 to $4 per net ton. New discounts are as follows: Black—2 in.—plus 13.65, 2½ in. —plus 7.15, 3 in.—plus 4.65, 3½ and 4 in.—plus 3.15, 5 in.—plus 1.80, and 6 in.—minus 0.70. Galvanized—2 in.—plus 28.65, 2½ in. —23.90, 3 in.—plus 21.40, 3½ and 4 in.—plus 19.90, 5 in.—plus 18.55, and 6 in.—plus 16.05.

"These reductions," says a company spokesman, "will bring our export prices in line with domestic delivered prices at seaboard."

Sheet and Strip—New business is generally holding level with little forward buying. A slight dip in December orders and a rebound in January is expected. Reasons for the year-end slowdown: Customer inventory taking, concern about taxes on inventories at hand, and the impact of the holidays on business activity. As customers adjust to their new ordering patterns the mills are getting fewer cancellations and cutbacks. **Midwest** mills are meeting more competition from foreign flat-rolled producers.

Plate and Structurals — Heavier shipments of sheared mill plate from the **East** are coming into **Midwest** markets. Users there report they can get delivery in the month specified, a change from previous delays. However, allocation of product continues with a large **Eastern** producer retaining "liberal" quotas for January. Mill customers are now generally being offered tonnage above their former quota levels.

Bar — Year-end inventory concern on part of buyers is holding down order volume. As a result December shipments will probably dip below November's with some predicted upturn in January. Despite bursts of ordering from auto firms, Chicago mills see a dropoff of 15 pct in December orders. Market problems there are warehouse cutbacks plus very slow ordering from appliance and farm equipment buyers.

Wire Products—Mill production continues at a little over half of capacity. Sales outlook is bleak until resumption of seasonal ordering in late first quarter. Domestic mills will make a concerted sales push next spring on light gage, high tensile merchant wire but foreign competitors still have the price edge over them.

Pipe and Tubing—Market is dull except for large linepipe which is still booked solid into 1960-61. There is some fabricating time open on this product at **Cleveland** mills but it's expected to snap shut in the second quarter of '58. An **Eastern** producer describes buttweld, pressure and mechanical tubing as "extremely soft," seamless pipe as "fair," and oil country goods as "fair to middling." Prices of oil country goods, according to **Pittsburgh** sources, are now on a direct shipment basis.

Warehouses — December looks like a very poor sales month—estimated by some distributors as the lowest month of the year. Result is that many outlets are reducing inventories on products where they had a balanced stock as late as October.

PURCHASING AGENT'S CHECKLIST

Wide aluminum sheets are no longer a specialty product. **P. 96**

Market for farm machinery is gaining strength. **P. 98**

New machine tool orders at lowest ebb in seven years. **P. 117**

COMPARISON OF PRICES

(Effective Dec. 3, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Dec. 3 1957	Nov. 26 1957	Nov. 5 1957	Dec. 4 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	47.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$10.30	$10.30	$10.30	$9.95
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.65
Special coated mfg. ternes	9.55	9.55	9.55	9.20
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	40.75
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.525	$5.075
Light rails	6.50	6.50	6.50	6.00
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$77.50	$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rod and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.622¢

	Dec. 3 1957	Nov. 26 1957	Nov. 5 1957	Dec. 4 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.51	$70.51	$70.51	$67.76
Foundry, Valley	66.50	66.50	66.50	63.00
Foundry, Southern Cin'ti	71.65	71.65	71.65	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	63.00
Basic, del'd Philadelphia	70.01	70.01	70.01	66.84
Basic, Valley furnace	66.00	66.00	66.00	62.50
Malleable, Chicago	66.50	66.50	66.50	63.00
Malleable, Valley	66.50	66.50	66.50	63.00
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	11.75
Pig Iron Composite: (per gross ton)				
Pig iron	$66.42	$66.42	$66.42	$63.04
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$32.50*	$33.50	$32.50	$66.50
No. 1 steel, Phila. area	33.00	33.00	35.00	62.50
No. 1 steel, Chicago	30.50	30.50	32.50	66.50
No. 1 bundles, Detroit	*21.50*	22.50	22.50	60.50
Low phos., Youngstown	32.50	30.50	33.50	70.50
No. 1 mach'y cast, Pittsburgh	50.50	50.50	50.50	61.50
No. 1 mach'y cast, Philadel'a	50.50	50.50	50.50	59.50
No. 1 mach'y cast, Chicago	40.50	40.50	40.50	58.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$32.00*	$32.33	$33.33	$65.17
No. 2 bundles	*24.00*	24.33	25.00	52.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$15.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$18-19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	27.00	27.00	27.00	40.00
Copper, Lake, Conn.	27.00	27.00	27.00	40.00
Tin, Straits, N. Y.	90.25†	88.00*	89.625	110.50
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	12.80	13.30	13.30	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

IRON AND STEEL SCRAP MARKETS

Industrial Tonnages Sustain Mills

Dealers are supplying very little of the scrap that mills are receiving.

List scrap and industrial contracts make it easy for mills to stay out of the market at current low operating rates.

▪ Industrial scrap now accounts for the bulk of the scrap intake in most markets.

Large tonnages of list scrap and scrap based on industrial contracts have enabled mills to stay out of the dealer market for a period of weeks and even months. At the low operating rate, and little hope for improvement, there is little reason for mills to call on dealers.

This is a principal reason for the severe depressing of the dealer market. Many quoted prices are not determined by mill buying today, but by the minimum point at which scrap could move.

Even the top grade industrial lists do not find a ready home. Some railroad lists continue to be withdrawn because of low prices and some auto tonnages are not snapped up by the mills.

A major mill which boasted some weeks ago that it would stay out of the dealer market this year is now assured of living up to that promise. Other mills have made similar statements, adding to the general panic.

The general conclusion that the market is at bottom only indicates that the market may have dried up at about this point. There is little hope for significant purchases. Only St. Louis, which continues as the highest market in the nation, has reflected any mill intention to buy.

The IRON AGE No. 1 heavy melting Composite Price edged down another $.33 on the basis of a $1 decline in Pittsburgh.

Pittsburgh—On the basis of final industrial lists, prices of openhearth grades, low phos and factory bundles are down $1. There has been little change in the level at which a given quantity of dealer scrap will flow. New prices reflect a further decline in mill demand. One local mill is now paying $29 for No. 2 bundles. A mill on the fringe of the district has set dealer prices of $31 for No. 1 heavy and $25 for No. 2 bundles.

Chicago—The decline in the market came to a temporary halt. Mill demand continues slow, but dealer stocks are at a low ebb and little fresh material is coming in. Mills offering to buy continue to peg their offers at lower prices, but these are bringing in little scrap. Material continues to move on old orders at substantially higher prices, further halting the downward trend.

Philadelphia — This market is very quiet. Adding to the quietness is news that two independent mills in the district will buy no scrap for the remainder of the month. Quoted prices can be considered nominal for the most part. Cupola cast dropped $1 on basis of a sale.

New York—This market drags along, dead on its feet. A continuing stream of export is the only life, and so far has held prices at quoted levels. Turnings business is virtually nonexistent, but trade sources agree present prices are at the minimum at which tonnages could be bought. Slow cast sales narrowed the range of mixed yard cast to $30 top.

Detroit—The market is listless with some speculative buying in evidence. Brokers bought little scrap from industrial lists. Dealers who did indicated they were laying it down. Local mills haven't indicated whether they will buy scrap this month, leaving prices in doubt.

Cleveland—Auto lists were scattered among a wide group of brokers and even some dealers who are laying scrap down. Prices ranged from $28.50 to slightly over $30 on cars. A substantial part is going to the Pittsburgh area. Dealer scrap is involuntarily piling up.

St. Louis—A leading mill has extended completion of unfilled November orders through December and has issued new December orders at unchanged prices. Several railroads have withdrawn their lists because of low prices. Blast furnace grades are up $2.

Birmingham—Very little scrap is moving in the district and prices on most grades are quoted unchanged. Some rail items are lower while unstripped motor blocks went against the trend and advanced $2. The exoprt market is at a standstill.

Cincinnati—Prime grades are unchanged in area buying programs and dealers are not too interested in selling at prevailing levels. Major area list tonnage went slightly over $26 on track. Foundry business is sluggish and upriver demand nil.

Buffalo—The market has been inactive but a very small sale may be made before the week end. Dealers feel the price bottom has been reached here.

Boston—The market continues at a low ebb. There is little domestic activity and no export to speak of.

West Coast — Mills are taking scrap only on a hand-to-mouth basis. There is very little export activity now. However, five cargo ships are reported due in soon for scrap. If they arrive as expected, prices should remain at their present levels.

SCRAP PRICES *(Effective Dec. 3, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and ms. turn.	16.00 to 17.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Low phos. punch'gs plate	35.00 to 36.00
Heavy turnings	31.00 to 32.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	49.00 to 50.00
Rails 2 ft and under	56.00 to 57.00
RR steel wheels	47.00 to 48.00
RR spring steel	47.00 to 48.00
RR couplers and knuckles	47.00 to 48.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	37.00 to 38.00

Chicago

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate	39.00 to 40.00
Low phos. 3 ft and under	38.00 to 39.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	48.00 to 49.00
Rails 2 ft and under	47.00 to 48.00
Locomotive tires cut	43.00 to 44.00
Cut bolsters & side frames	40.00 to 41.00
Angles and splice bars	45.00 to 46.00
RR steel car axles	48.00 to 49.00
RR couplers and knuckles	42.00 to 43.00
No. 1 machinery cast	40.00 to 41.00
Cupola cast	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Cast iron brake shoe	35.00 to 36.00
Cast iron wheels	39.00 to 40.00
Malleable	46.00 to 47.00
Stove plate	33.00 to 34.00
Steel car wheels	44.00 to 45.00

Philadelphia Area

No. 1 hvy. melting	$32.50 to $33.50
No. 2 hvy. melting	29.50 to 30.50
No. 1 dealer bundles	33.50 to 34.50
No. 2 bundles	23.50 to 24.50
No. 1 busheling	33.50 to 34.50
Machine shop turn.	21.00 to 22.00
Mixed bor. short turn.	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	41.00 to 42.00
Low phos. 2 ft and under	42.00 to 43.00
Low phos. punch'gs	42.00 to 43.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	28.50 to 29.50
RR steel wheels	45.00 to 46.00
RR spring steel	45.00 to 46.00
Rails 18 in. and under	64.00 to 65.00
Cupola cast	36.00 to 37.00
Heavy breakable cast.	36.00 to 37.00
Cast iron car wheels	41.00 to 42.00
Malleable	56.00 to 57.00
Unstripped motor blocks	32.00 to 33.00
No. 1 machinery cast.	50.00 to 51.00

Cleveland

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 dealer bundles	26.00 to 27.00
No. 1 factory bundles	29.50 to 30.50
No. 2 bundles	18.00 to 19.00
No. 1 busheling	26.00 to 27.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Cut struct'r'l & plates, 2 ft & under	33.00 to 34.00
Drop forge flashings	26.00 to 27.00
Low phos. punch'gs, plate	27.00 to 28.00
Foundry steel, 2 ft & under	31.00 to 32.00
No. 1 RR heavy melting	32.00 to 33.00
Rails 2 ft and under	31.00 to 32.00
Rails 18 in. and under	54.00 to 55.00
Railroad grate bars	14.00 to 15.00
Steel axle turnings	15.00 to 16.00
Railroad cast.	42.00 to 43.00
No. 1 machinery cast.	44.00 to 45.00
Stove plate	40.00 to 41.00
Malleable	54.00 to 55.00

Youngstown

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. plate	32.00 to 33.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.50 to 27.50
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	23.50 to 24.50
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Low phos. plate	35.00 to 36.00
Scrap rails, random lgth.	41.00 to 42.00
Rails 2 ft and under	51.00 to 52.00
RR steel wheels	38.00 to 39.00
RR spring steel	34.00 to 35.00
RR couplers and knucklers	34.00 to 35.00
No. 1 machinery cast.	41.00 to 42.00
No. 1 cupola cast	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 dealer bundles	21.00 to 22.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	20.00 to 21.00
Drop forge flashings	20.00 to 21.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Low phos. punch'gs plate	21.00 to 22.00
No. 1 cupola cast.	29.00 to 30.00
Heavy breakable cast.	24.00 to 25.00
Stove plate	24.00 to 25.00
Automotive cast.	32.00 to 33.00

St. Louis

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	16.00 to 17.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
No. 1 RR hvy. melting	38.50 to 39.50
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	48.00 to 49.00
Angles and splice bars	40.00 to 41.00
Std. steel car axles	44.00 to 45.00
RR specialties	43.00 to 44.00
Cupola cast	42.00 to 43.00
Heavy breakable cast.	35.00 to 36.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	35.00 to 36.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	46.00 to 47.00
Unstripped motor blocks	35.00 to 36.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	23.00 to 24.00
Elec. furnace, 3 ft & under	29.00 to 30.00
Machine shop turn.	9.50 to 10.50
Mixed bor. and short turn.	9.50 to 10.50
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	15.00 to 16.00
No. 1 machinery cast.	34.00 to 35.00
Mixed cupola cast.	28.00 to 29.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	26.00 to 27.00
Unstripped motor blocks	27.00 to 28.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 2 dealer bundles	19.00 to 20.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	23.00 to 24.00
No. 1 machinery cast.	34.00 to 35.00
Mixed yard cast.	29.00 to 30.00
Charging box. cast.	30.00 to 31.00
Heavy breakable cast.	30.00 to 31.00
Unstripped motor blocks	27.00 to 28.00

Birmingham

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	15.00 to 16.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	38.00 to 39.00
Structural and plate, 2 ft	38.00 to 39.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	46.00 to 47.00
Angles & splice bars	40.00 to 41.00
Rerolling rails	47.00 to 48.00
No. 1 cupola cast.	47.00 to 48.00
Stove plate	47.00 to 48.00
Charging box cast.	22.00 to 23.00
Cast iron car wheels	37.00 to 38.00
Unstripped motor blocks	37.00 to 38.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos., 18 in. and under	37.00 to 38.00
Rails, random length	43.00 to 44.00
Rails, 18 in. and under	54.00 to 55.00
No. 1 cupola cast.	35.00 to 36.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	47.00 to 48.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	34.00
No. 2 bundles	26.00
Machine shop turn.	20.00
Cast iron borings	20.00
No. 1 RR hvy. melting	36.00
No. 1 cupola cast.	47.00

Los Angeles

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	32.00
No. 2 bundles	$24.00 to 25.00
Machine shop turn.	15.00
Shoveling turnings	19.00
Cast iron borings	19.00
Elec. furn. 1 ft and under (foundry)	47.00
No. 1 RR hvy. melting	39.00
No. 1 cupola cast.	42.00 to 43.00

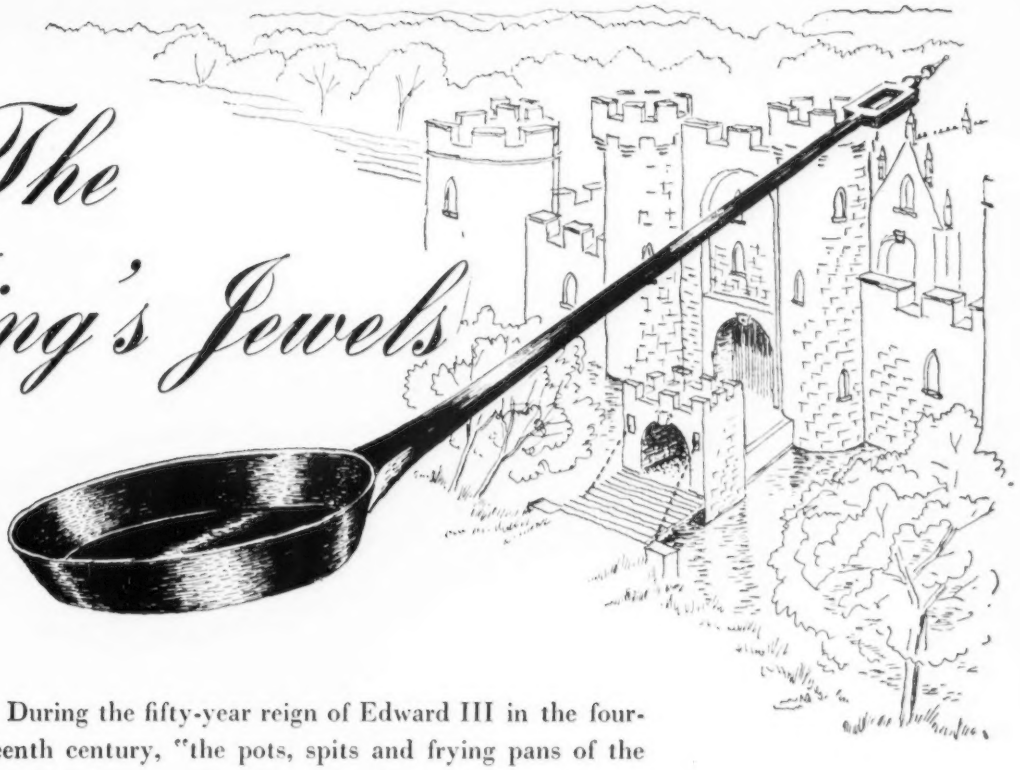
Seattle

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	34.00
No. 2 bundles	27.00
No. 1 cupola cast.	38.00
Mixed yard cast.	38.00

Hamilton, Ont.

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	34.00
No. 2 bundles	24.00
Mixed steel scrap	29.00
Busheling	24.00
Bush., new fact, prep'd	34.00
Bush., new fact, unprep'd	28.00
Machine shop turn.	19.00
Short steel turn.	23.00
Mixed bor. and turn.	19.00
Rails, rerolling	43.00
Cast scrap	$44.00 to 49.00

The King's Jewels



During the fifty-year reign of Edward III in the fourteenth century, "the pots, spits and frying pans of the royal kitchen were classed among the king's jewels"... In 1645, at Lynn, Mass., a one-quart kettle, the first iron casting made in America, was given to Thomas Hudson, younger brother of Hendrik Hudson, as part consideration for sixty acres of land.

Today, cooking utensils may not be so highly valued, but they represent one of the thousands of indispensable demands upon iron and steel production—for civilian and military requirements.... To assure a continuity of this production, a constant supply of scrap must be maintained.

For the purchase or sale of iron or steel scrap...

phone or write "Your Chicago Broker"

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231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Outlook Is For Less Tin in 1958

International Tin Agreement meeting ponders solution to oversupply, sliding price.

Trade expects 10 pct cutback on exports.

U. S. lead price drops ½¢ per lb on sagging market.

■ There will be less tin for industry in 1958. The International Tin Agreement Council is meeting this week to see to it.

Under the official agreement two things are possible: Increased buffer stock buying, and restricting exports from producers.

Cause of the Problem — Action is deemed necessary because surplus free world production, combined with Russia's marketing of good quality tin outside the Iron Curtain, at lower than going prices, has dropped the price and boosted supplies to dangerous levels.

There had been talk that the situation might be more than ITA could handle. Some observers interpreted the move-up of the ITA Council sessions from Dec. 11 to Dec. 4 as panic. But as the meeting approached this sentiment all but disappeared.

The New York tin price halted its slide, and even showed some signs of recovery. Dealers say this is in anticipation of some effective ITA action.

Expect Export Cut—Consensus is that continued buffer stock buying at current rates, and a 10 pct reduction in exports would be enough to prop up the market at an equitable level.

There have been some voices in the wilderness crying out against any form of export or production restrictions. But they don't carry enough weight to slow the obvious move in this direction.

No matter what is decided, nothing can happen until the buffer stock contains 10,000 tons of tin. As of June the buffer stock had 3916 tons. A leading New York trader estimated about mid-November that the stock contained over 8000 tons. It seems feasible that the mark will be hit early in 1958, with over $4 million left for more buying.

Will Ante Up—At that time the Council can call for contributions from producing countries equivalent to 5000 tons of tin total. At least 25 pct must be cash, the rest may be either money or metal.

Lead

In the face of a sagging market, and increasing sentiment that the industry is not going to get import quotas, the lead price dropped ½¢, to 13¢ per lb at New York, 12.80¢ at St. Louis.

A leading smelter made the initial move early Monday. All major sellers followed the same day. Since the price paid for the concentrates depends on the market price of the metal there was no chance of holding the line.

Scrap

Of every 100 lb of copper-base, semi-finished products received by fabricators, 20 lb becomes scrap. It varies by industry, from a high of 47.3 pct for screw machine products to a low of 4.9 pct for electrical welding apparatus.

Business and Defense Services Administration reports the average scrap generation ratios for 69 industries.

Aluminum

Aluminum Co. of America has bumped the price of its roll valley and builders' strip, but slightly less than ½¢ per lb. A single roll of roll valley, .019 gage, 14 in. wide, 50 ft long, now costs $7.80. It used to cost $7.73.

The same size roll of builders' strip, .016 gage, 25 rolls per pallet, costs $6.50. It used to cost $6.08.

The company said the hike was due to increased manufacturing costs.

Tin prices for the week: Nov. 27—89.25; Nov. 28—holiday; Nov. 29—91.00; Dec. 2—90.375; Dec. 3—90.25.*

* Estimate

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in November based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	27.00
Copper, Lake	27.00
Straits Tin, New York	89.229
Zinc, E. St. Louis	10.00
Lead, St. Louis	13.30
Aluminum ingot	28.10

Note: Quotations are going prices.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum pig	26.00	25.00	8/1/57
Aluminum ingot	28.10	27.10	8/1/57
Copper (E)	27.00	28.50	9/3/57
Copper (CS)	25.00	25.50	11/21/57
Copper (L)	27.00	28.50	9/3/57
Lead, St. L.	12.80	13.30	12/2/57
Lead, N. Y.	13.00	13.50	12/2/57
Magnesium ingot	36.00	34.00	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	165-250	165-225	5/5/57
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig, Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. **TIN:** see above; other primary prices, pg. 181.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate
("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3
1100, 3003	46.6	44.3	43.6	42.7
5052	54.0	48.9	47.2	45.4
6061-0	51.4	47.0	45.2	45.1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	45.0-46.8	60.4-64.1
12-14	45.7-47.2	61.3-65.8
24-26	49.0-49.5	72.1-76.8
36-38	58.0-58.6	96.2-99.8

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	⅞-1	1¼-1½
Price	63.0	62.5	61.0	58.6

Roofing Sheet, Corrugated
(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.420	$1.893	$2.367	$2.839
.024 gage	1.774	2.366	2.957	3.549

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250-3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	50.13	.....	47.36	50.32
Brass, 70/30	44.02	44.56	45.26	46.93
Brass, Low	46.50	47.04	46.44	49.31
Brass, R L	47.37	47.91	47.31	50.18
Brass, Naval	48.27	.....	42.58	51.68
Muntz Metal	46.39	.....	42.20	.....
Comm. Bs.	48.78	49.32	48.72	51.34
Mang. Bs.	52.01	.....	46.11	.....
Phos. Bs. 5%	69.07	.....	69.57	.....

Free Cutting Brass Rod $2.30

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-$8.75; alloy, $10.75. Wire, rolled and/or drawn, commercially pure, $7.50-$8.00; alloy $10.00; Bar, HR or forged, commercially pure, $6.15-$6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.00-$6.20.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis ... $ 1.31
Cobalt, 97-99% (per lb) .... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 39.50 to 53.50
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9%, dollars per troy oz... $ 2.25
Iridium, dollars per troy oz. ... $80 to $90
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $225 to $230
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz... $23 to $24
Platinum, dollars per troy oz.. $82 to $87
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 90.00
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 27.25
No. 120 ..... 26.25
No. 123 ..... 25.50
80-10-10 ingot
No. 305 ..... 31.25
No. 315 ..... 29.25
88-10-2 ingot
No. 210 ..... 38.25
No. 215 ..... 34.00
No. 245 ..... 30.75
Yellow ingot
No. 405 ..... 22.75
Manganese bronze
No. 421 ..... 24.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.25-26.00
0.60 copper max 25.00-25.75
Piston alloys (No. 122 type) .. 24.25-25.00
No. 12 alum. (No. 2 grade) ... 22.00-23.00
108 alloy 22.25-23.25
195 alloy 25.25-26.75
13 alloy (0.60 copper max.) ... 25.00-25.75
AXS-679 ..... 22.25-23.25

(Effective Dec. 2, 1957)

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 23.00-24.00
Grade 2—92-95% 21.75-22.50
Grade 3—90-92% 20.50-21.50
Grade 4—85-90% 18.25-19.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	21	20¼
Yellow brass	17⅝	15⅝
Red brass	20¼	19⅞
Comm. bronze	21	20¼
Mang. bronze	16½	15⅝
Yellow brass rod ends	17⅛	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 21
No. 2 copper wire 19½
Light copper 17⅛
*Refinery brass 19¼
Copper bearing material 18⅝
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 21
No. 2 copper wire 19½
Light copper 17⅛
No. 1 composition 19¼
No. 1 comp. turnings 18⅝
Hvy. yellow brass solids 18
Brass pipe 15½
Radiators 15¼

Aluminum

Mixed old cast. ..... 13 —14
Mixed new clips ..... 15½—16½
Mixed turnings, dry ..... 13½—14½

Dealers' Scrap

Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 18½—19
No. 2 copper wire ..... 16½—17
Light copper ..... 16 —15½
Auto radiators (unsweated) .. 11¾—12
No. 1 composition ..... 15½—16
No. 1 composition turnings... 15 —15½
Cocks and faucets ..... 12 —12½
Clean heavy yellow brass.... 11 —11½
Brass pipe ..... 13½—13
New soft brass clippings .... 13 —13½
No. 1 brass rod turnings .... 11¼—11⅝

Aluminum

Alum. pistons and struts .... 5½— 6
Aluminum crankcases ..... 10½—11
1100 (2S) aluminum clippings 14 —14½
Old sheet and utensils ..... 10½—11
Borings and turnings ..... 6½— 7
Industrial castings ..... 10½—11
2024 (24S) clippings ..... 12 —12½

Zinc

New zinc clippings ..... 4 — 4½
Old zinc ..... 3 — 3¼
Zinc routings ..... 1⅞— 2
Old die cast scrap ..... 1½— 1¾

Nickel and Monel

Pure nickel clippings 45-50
Clean nickel turnings 40-45
Nickel anodes 45-50
Nickel rod ends 45-50
New Monel clippings 31-33
Clean Monel turnings 20-23
Old sheet Monel 28-30
Nickel silver clippings, mixed. 13
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 8½— 9
Battery plates (dry) ..... 4 — 4¼
Batteries, acid free ..... 2¾— 3

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 11 —11½
Solder joints ..... 15 —15½
Siphon tops 42
Small foundry type ..... 12½—12¾
Monotype ..... 12½—12¾
Lino. and stereotype ..... 11½—11¾
Electrotype ..... 10½—10¾
Hand picked type shells ..... 7½— 8
Lino. and stereo. dross ..... 3½— 3¾
Electro dross ..... 2¾— 3

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$114.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *S10*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													15.05 *C11*
	Conshohocken, Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*	7.20 *A2*	7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *D1*				
	Baltimore, Md.									7.15 *T8*				
	Phoenixville, Pa.					5.325 *P2*		5.325 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	Bridgeport, Wallingford, Conn.	$80.50 *N8*	$101.00 *N8*	$114.00 *N8*						7.60 *W1*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *N7* 7.70 *A5*				15.40 *N7* 15.20 *T8*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover, Ohio		$96.00 *R3*	$114.00 *R3, T5*						7.15 *G4*		10.45 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1,Y1 W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8 M8*			8.10 *W8, S9,I3*	15.05 *A1, S9,G4*
	Cleveland, Ohio									7.15 *A5,J3*		10.45 *A5*	8.10 *J3*	
	Detroit, Mich.			$114.00 *R5*					5.025 *G3, M2*	7.25 *M2,D1, D2,G3,P11*	7.425 *G3*	10.60 *D2* 10.55 *G3*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$114.00 *U1, Y1*		5.275 *U1, I3*	7.75 *U1, I3*	5.275 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.60 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *J3*				15.20 *J3*
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$114.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.50 *S1* 10.45 *R3*	8.10 *S1*	15.05 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$114.00 *U1, C11,B7*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4, S7*			8.10 *S9*	15.05 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.225 *W3*	5.275 *W3*			4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.50 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$114.00 *Y1*			7.75 *Y1*			7.15 *Y1,J3*	7.325 *U1, Y1*	10.65 *Y1*	8.10 *U1, Y1*	15.05 *J3* 10.65 *Y1*
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.075 *K1*	8.55 *K1*	6.225 *K1*	5.825 *K1*	9.00 *K1*				
	Geneva Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*							
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*	9.05 *J3*			9.30 *B2*	17.25 *J3*
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			5.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R3,C16*	7.75 *T2*		4.925 *T2, R3,C16*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*						8.35 *S2*	

(Effective Dec. 2, 1957)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25* lb. base box	Electro* *0.25* lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*		6.15 *W6*			
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*			$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*	6.25 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.									6.45 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.35 *L1*			
	Ashland, Ky	4.925 *A7*		6.60 *A7*	6.625 *A7*								
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*									
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*			6.15 *A5, R3, W8, N4, K2*			
	Sterling, Ill.									6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3, J3*	8.975 *R3, J3*		6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G3*	9.075 *G3*					
	Newport, Ky	4.925 *A1*	6.05 *A1*										
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3, Y1*	6.05 *U1, I3, Y1*	6.60 *U1, I3*	6.625 *U1, I3, Y1*	7.00 *U1*	7.275 *U1, Y1, I3*	8.975 *U1, Y1*		6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1, Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.125 *G2*	6.25 *G2*	6.80 *G2*	6.825 *G2*							$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*						6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *E2*							
	Middletown, Ohio		6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3, S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1, R3*	7.275 *R3*	8.975 *S1, R3*				$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 *U1, J3, P6*	6.05 *U1, J3, P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, J3*	8.975 *U1, J3*	9.725 *U1*	6.15 *A5, J3, P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*							6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3, W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*			$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*		6.15 *Y1*			
WEST	Fontana Cal.	5.825 *K1*	7.30 *K1*				8.175 *K1*	10.275 *K1*			$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*											
	Kansas City, Mo.									6.40 *S2*			
	Los Angeles, Torrance, Cal.									6.95 *B2*			
	Minnequa, Colo.									6.40 *C6*			
	San Francisco, Niles, Pittsburgh, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*						6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2, R3*	6.60 *T2, R3*						6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.									6.40 *S2*			

† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box.
* COKES: 1.50-lb. add 25¢.
ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.

(Effective Dec. 2, 1957)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfrs'. Bright
	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.35 *B5*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B3*		7.65 *W6*
	Claymont, Del.							5.10 *C4*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.10 *L4*		7.20 *L4*	7.925 *L4*	
	Conshohocken, Pa.							5.20 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.80 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J. Camden, N. J.			7.75 *W10* 7.75 *P10*		8.95 *W10* 8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.	5.65 *N8*	5.65 *N8*	7.65 *N8* 7.85 *W10* 7.80 *J3*	6.55 *N8*	8.925 *N8*						
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer, Worcester, Readville, Mass. Mansfield, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5, W6*
	Spring City, Pa.			7.75 *K4*		8.95 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland,Newport,Ky.							5.10 *A7,A1*		7.20 *A1*		
	Canton, Massillon, Ohio			7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2, T5*						
	Chicago, Joliet, Waukegan, Ill. Harvey, Ill.	5.425 *U1,R3, W8,N4,P13*	5.425 *U1,R3, N4,P13*	7.30 *A5, W10,W8 B5,L2,N9*	6.475 *U1,R3, W8*	8.775 *A5, W10,W8 L2,N8,B5*	7.925 *U1,W8*	5.10 *U1,A1, W8,13*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1,W8*	7.65 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13*		8.775 *A5, C13*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3, J3*	7.65 *A5, C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.30 *P3* 7.50 *P8,B5*	6.475 *R5* 6.575 *G3*	8.775 *R5* 8.975 *B5,P3, P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 *U1,I3, Y1*	5.425 *U1,I3, Y1*	7.30 *R3,J3*	6.475 *U1,I3, Y1*	8.775 *R3,M4*	7.925 *U1, Y1*	5.10 *U1,I3, Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1, Y1,I3*	7.75 *M4*
	Granite City, Ill.							5.30 *G2*				
	Kokomo, Ind											7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3, S1*	
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 *U1,J3*	5.425 *U1,J3*	7.30 *A5,B4, R3,J3,C11, W10,S9,C8*	6.475 *U1,J3, C11,B7*	8.775 *A5, W10,R4,S9, C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3, B7*	7.625 *U1,J3, B7*	7.65 *A5, J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W5*				
	Youngstown, Ohio	5.425 *U1,R3, Y1*	5.425 *U1,R3, Y1*	7.30 *A5,Y1, F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3, Y1*		7.20 *Y1*	7.625 *U1, R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.175 *J5* 6.125 *K1*	6.175 *J5* 6.125 *K1*		7.525 *K1*		8.625 *K1*	5.90 *K1*		8.00 *K1*	8.425 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.65 *P14*	8.625 *B2*					8.60 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7 C6*
	Seattle Wash.	6.175 *B2,N6*	6.175 *B2*				8.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.625 *A8*									7.85 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3, C16*	5.425 *T2,R3, C16,S11*	7.90 *C16*			7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.45 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

(Effective Dec. 2, 1957)

† Merchant Quality—Special Quality 35¢ higher

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 J. & L. Steel Co., Stainless Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING — **Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.**

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh *N1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+1.00								
Lorain *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25									
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh *N1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

(Effective Dec. 2, 1957)

To identify producers, see Key on preceding page

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.74	T-1
18	4	1	—	5	2.445	T-4
18	4	2	—	—	1.905	T-2
1.5	4	1.5	8	—	1.10	M-1
6	4	3	6	—	1.49	M-3
6	4	2	5	—	1.245	M-2
High-carbon chromium					.925	D-3, D-5
Oil hardened manganese					.475	O-2
Special carbon					.36	W-1
Extra carbon					.36	W-1
Regular carbon					.305	W-1

Warehouse prices on and east of Mississippi are 1¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

		Plate (*A3, J2, L4, C4*)			Sheet (*I2*)
	Cladding	10 pct	15 pct	20 pct	20 pct
Stainless Type	302				37.50
	304	37.95	42.25	46.70	40.00
	316	44.40	49.50	54.50	58.75
	321	40.05	44.60	49.30	47.25
	347	42.40	47.55	52.80	57.00
	405	29.85	33.35	36.85	.....
	410	29.55	33.10	36.70	.....
	430	29.80	33.55	37.25	.....

CR Strip (89) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.525	6.50	6.975				14.75
Cleveland *R3*				9.75			
So. Chicago *R4*							
Ensley *T2*	5.525	6.50					
Fairfield *T2*		6.50		9.75		6.60	
Gary *U1*	5.525					6.60	
Huntington *C6*		6.50					
Ind. Harbor *I6*	5.525		6.975	9.75		6.60	
Ind. Harbor *Y1*				9.75			
Johnstown *B3*		6.50					
Joliet *U1*			6.975				
Kansas City *S2*				9.75			14.75
Lackawanna *B4*	5.525	6.50	6.975			6.60	
Lebanon *B1*			6.975		14.50		14.75
Minnequa *C6*	5.525	7.00	6.975	9.75		6.60	14.75
Pittsburgh *P5*							14.75
Pittsburgh *J3*				9.75			
Seattle *B2*				10.25		6.75	15.75
Steelton *B4*	5.525		6.975			6.60	
Struthers *Y1*				9.75			
Torrance *C7*						6.75	
Williamsport *S5*		6.50					
Youngstown *R4*				9.75			

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$15.00 to $15.75
Foundry, beehive (f.o.b.)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville Is., Pa.	29.25

LAKE SUPERIOR ORES

51.50¢ Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.625	
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Special Motor		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55		
		Grain Oriented	
Trans. 58	16.05	Trans. 66	20.20
Trans. 52	17.10	Trans. 80	19.20
		Trans. 73	19.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I6*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N4*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	26.00	40	100, 110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.75	24	72 to 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.00
4	40	35.00	8	60	13.30
3	40	37.00			
2½	30	39.25			
2	24	60.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standard chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅜ to ⅛-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Midwest	17.00
Missouri Valley	15.00

(Effective Dec. 2, 1957)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Am'ld ¢ lb.	Merch. Wire Galv. ¢ lb.
Alabama City *R3*	173	187		212	193	8.65	9.20
Aliquippa *J3***	173	190			190	8.65	9.325
Atlanta *A8***	175	192		214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	8.75	9.425**
Buffalo *W6*						8.65	8.95*
Chicago *N4****							
Cleveland *A6*							
Cleveland *A5*						8.65	
Crawf'dav. *M4***	175	192		214	198	8.75	9.425
Donora, Pa. *A5*	173	187		212	193	8.65	9.20
Duluth *A5*	173	187		212	193	8.65	9.20
Fairfield, Ala. *T2*	173	187		212	193	8.65	9.20
Galveston *D4*	9.10‡						
Houston *S2*	178	192		217	198	8.90	9.45
Jacksonville *M4*	184 1	197		219	203	9.00	9.675
Johnstown *B3***	173	190	172		196**	8.65	9.325**
Joliet, Ill. *A5*	173	187		212	193	8.65	9.20
Kokomo *C9**	175	189		214	195*	8.75	9.30*
L. Angeles *B2****						9.60	10.275
Kansas City *S2**	178	192		217	198*	8.90	9.45*
Minnequa *C6*‡	178	192	177	217	198‡	8.90	9.45‡
Monessen *P6*					193	8.65	9.20
Palmer, Mass. *W6*						8.95	9.50*
Pittsburg, Cal. *C7*	192	210			213	9.60	10.15
Rankin, Pa. *A5*	173	187			193	8.65	9.20
So. Chicago *R3*	173	187			193	8.65	9.20
S. San Fran. *C6*‡				236		9.60	10.15‡
SparrowsPt. *B3***	175			214	198	8.75	9.425
Struthers, O. *Y1**						8.65	9.30
Worcester *A5*	179					8.95	9.50
Williamsport *S5*							

* Zinc less than .10¢.
** 11-12¢ zinc.
*** .10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60		
Franklin Park, Ill. *T8*	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *J3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Pittsburgh *S7*	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *J3*	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	
	2½	12	48.94	57.31	
	3	12	56.51	66.18	
	3½	11	65.97	77.25	
	4	10	87.61	102.59	

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	49	54	56	57
⅝" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	60½
⅞ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½

C. P. Hex, reg. & hvy.

¾ in. and smaller	60½
⅞ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½

Hot Galv. Hex Nuts (All Types)

¾ in. and smaller	46½

Semi-finished Hex Nuts

⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller	63

Rivets

	Base per 100 lb
½ in. and larger	$12.25
	Pct. Off List
7/16 in. and smaller	19

Cap Screws

	Discount (Packages) *Full Finished H. C. Heat Treat*	
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	40	26
¾", ⅞", and 1" diam. x 6" and shorter	22	3
⅝" diam. and smaller x longer than 6"	8	+13
¾", ⅞", and 1" diam. x longer than 6"	+ 6	+32

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	58	49
¾" through 1" dia. x 6" and shorter	45	33

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	19	32
Bulk — *Quantity*		
To ¼" diam. incl. — 25,000-200,000	9	54
5/16 to ½" diam. incl. — 25,000-200,000	9	54
All diam. over 3" long — 5,000-100,000	—	54

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
In Bulk — *Quantity*		
⅜" diam. & smaller — 15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.7
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955. value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	43.50
Electrodeposited	33.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots	16.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical $1.13 per lb.	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	74.70
Copper sulphate, 100 lb bags, per cwt.	11.55
Nickel salts, single, 100 lb bags	32.50
Nickel chloride, freight allowed, 300 lb	48.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.10)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 10,000 lb or more	31.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, freight allowed west of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	12.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	27.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe	88.0¢ to $2.85
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	31.1¢ to 47.1¢
Copper, electrolytic	41.50¢
Copper, reduced	40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe. 03 max. Del'd	$5.00
Lead	21.50¢ lb, f.o.b. plant
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, chemically precipitated	$1.05
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder	13¢ plus met. value
Stainless steel, 302	$1.02
Stainless steel, 316	$1.30
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$3.75 (nominal)
Zinc, 5000 lb & over	17.5¢ to 30.7¢

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery† Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68	.....	.....	.....	.....
Baltimore	$.10	8.38	8.98	9.71	8.86	8.76	9.29	9.16	11.44*	16.18	15.18	19.73	18.98
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57	.....	.....	.....	.....
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	15.79	15.38	19.89	19.18
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.05*	16.34	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.15	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.44	18.96
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65	.....	.....	.....	17.60
Detroit	.15	8.58	9.85	10.50	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		8.45	9.75	.....	8.60	9.05	8.60	8.55	11.10	16.20	.....	19.30	19.05
Kansas City	.20	9.02	10.27	10.07	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles	.10	7.85	10.85	11.75	7.90	7.90	7.95	7.90	12.10	17.05	16.10	21.05	20.35
Memphis	.15	8.02	9.22	.....	8.12	8.35	8.39	8.25	9.85	.....	.....	.....	.....
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	15.02	15.19	18.42	18.99
Norfolk	.20	8.00	.....	.....	8.40	8.35	8.70	8.45	10.70	.....	.....	.....	.....
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61*	15.61	15.11	18.96	18.91
Pittsburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60
Portland		8.50	11.20	11.55	9.05	8.30†	8.65	8.65	14.50	18.50	16.10	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.80	14.05	16.55	16.35	20.65	20.15
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20	.....	17.35	21.55	21.05
St. Louis	.15	8.69	9.94	10.51	8.74	9.08	9.25	9.12	9.56	15.66	15.16	19.01	18.96
St. Paul	.15	8.94	10.19	10.76	8.99	9.45	9.53	9.37	9.81	.....	15.26	.....	19.06

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity.

†† 10¢ zinc. ‡ Deduct for country delivery. † 3/16 in. to ½ in. * C1018—1 in. rounds.

(Effective Dec. 2, 1957)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	
Birmingham *R3*	62.00	62.50*			
Birmingham *W9*	62.00	62.50*	66.50		
Birmingham *U4*	62.00	62.50*	66.50		
Buffalo *R3*	66.00	66.50	67.00	67.50	
Buffalo *H1*	66.00	66.50	67.00	67.50	
Buffalo *H6*	66.00	66.50	67.00	67.50	
Chester *P2*	66.50	67.00	67.50		
Chicago *I4*	66.00	66.50	66.50	67.00	
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50		
Fontana *K1*	75.00	75.50			
Geneva, Utah *C7*	66.00	66.50			
Granite City *G2*	67.90	68.40	68.90		
Hubbard *Y1*			66.50		
Ironton, Utah *C7*	66.00	66.50			
Midland *C11*	66.00				
Minnequa *C6*	68.00	68.50	69.00		
Monessen *P6*	66.00				
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*		66.50	67.00	67.50	
Sharpsville *S6*	66.00	66.50	66.50	67.00	
So. Chicago *R3*	66.00	66.50	66.50		
So. Chicago *W8*	66.00		66.50	67.00	
Swedeland *A2*	68.00	68.50	69.00	69.50	
Toledo *I4*	66.00	66.50	66.50	67.00	
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	74.00
Youngstown *Y1*			66.50	67.00	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31 0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div., $78.00, Niagara Falls (15.01 15.50), $101.00; Keokuk (14.01 14.50), $103.50; (15.51 16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.), $64.00. Add $1.00 premium for all grades silver to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.09	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50 52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2,* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2.*

Strip. Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2,* Washington, Pa., *W2;* W. Leechburg, Pa., *A5;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *J3,* Sharon, Pa., *S7;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1;* New Bedford, Mass. (25¢ per lb higher), *R6;* Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7,* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1,* Reading, Pa., *C2,* Titusville, Pa., *U2,* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5,* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R5;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen *P1;* Syracuse, *C11;* Bridgeville, *U2.*
Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R5;* Watervliet, *A3;* Pittsburgh, Chicago, *U1,* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

(Effective Dec. 2, 1957)

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.50
0.025% C (Simplex) 36.75
8.00% max C, 50-55% Cr, 3-6% max Si 25.00
8.50% max C, 50-55% Cr, 3% max Si 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads	27.50	14.20
Ton lots	32.75	15.65
Less ton lots	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.: Alloy, W. Va.: Sheffield, Ala.: Portland, Ore.	12.25
Johnstown, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed, pallets	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	24.20	22.90
98% Si, 0.75% Fe	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	13.00	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....	19.50	

Ferrovanadium

50-55% V delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

(Effective Dec. 2, 1957)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.60 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .. $1.38

Zirconium, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Boroxil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound ...	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

Market Very Quiet At Pittsburgh

Used machinery business dull with steel market sluggish and buyers uncertain about getting new defense orders.

Dealers' biggest problem — now that supplies of equipment are good—is finding buyers.

■ "September was terrible, October was worse, and November not much better," says one Pittsburgh dealer who specializes in electrical equipment.

Other dealers put it less bluntly. A few have felt a slight pickup. But most find things quiet and slow. Various reasons are given for the lag.

Middle of a Change—"The defense switch from tanks and planes to missiles has meant a changeover period for many plants," says one dealer. "They're just now getting started on new jobs and beginning to look for equipment."

"Companies are busy right now," says another dealer, "but they see backlogs shrinking. They're not in a mood to buy equipment."

Biggest single factor has been the steel slowdown. Much of the district's industry moves with steel and the mills are operating about 20 pct under capacity. The falloff has directly affected suppliers of steel mill equipment.

Foreign Interest Good—"We get few cold inquiries today," says one steel mill dealer. "You have to go out and develop business."

The same dealer reports a steady domestic demand for bar mills. There is also interest in small flat-rolling mills. Plants are looking for two-high and four-high mills with about 20-in. rolls for use in special defense applications. A fairly good supply of these is available but the requirements of buyers vary widely.

Foreign inquiries for steel mill equipment are holding up well. Bar mills are always in demand. Recent Latin American shipments include shears, roller levelers and other auxiliaries. One South American buyer has just ordered an angle and shape straightener.

Heavy Items Wanted — In the general machinery field, there has been a slight pickup in interest but sales are still slow. One dealer finds an improvement in inquiries for fabricating equipment and for planers, boring mills and other big machine tools. Buyers are looking for heavy production equipment.

Cranes Are Slow—Crane sales are off and crane inquiries more so. A few units have been sold in recent weeks. They have been fairly small units, ranging from 5 to 10 tons.

One encouraging aspect of the present situation is the improved supply of many types of equipment. This is true of cranes, steel mill equipment, and general equipment. "The problem is to find buyers," said one dealer.

October Sales Index

After registering a slight gain in September, used machine tool sales —according to the index of the Machinery Dealers National Assn. —declined again in October. The October index of 108.9 represented a 7 pct decline from the September index of 117.0

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS
450 cu. ft. Ingersoll Rand XRE 8" x 8" & 3½" x 8" 100 lb. Pressures, 100 H. P. A. C. Syn. Motor
2700 cu. ft. Ingersoll Rand PRE2, 36" x 18" x 21" 100 lb. Pressures, 500 H.P. Syn. Motor

BENDING ROLLS
10' x 10" Ga. Bertsch Initial Type
10' x ½" King Pyramid Type
10' x ¾" Ransome Pyramid Type
18' x 1" Niles Pyramid Type

BRAKE—PRESS TYPE
12' x ¼" Cincinnati

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H	56' Span 220/3/60
5 ton Cleveland	60' Span 115 Volt D.C.
5 ton Shepard Niles	70' Span 230 Volt D.C.
8 ton P&H	55' Span 220/3/60
10 ton Shepard Niles	38' Span 440/3/60
10 ton Shaw	48' Span 230 Volt D.C.
10 ton Shaw	120' Span 230 Volt D.C.
15 ton Shepard Niles	52' Span 230 Volt D.C.
15 ton Niles	75' Span 230/3/60
20 ton Shaw	28' Span 230 Volt D.C.
120 ton Shepard Niles	77' Span 220/3/60

DIEING MACHINE
150 ton Henry & Wright 3" Stroke, Roll Feed Scrap Cutter, 30 H.P. A.C. Motor

FORGING MACHINES
1" to 5" Acme, Ajax, National

FURNACE—MELTING
15 ton Heroult Top Charge, 12' Shell Complete with Transformers

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING
800 lb. to 20,000 lb. incl.

HEADERS
#250C Manville Solid Die Single Stroke
#44 Waterbury Farrel DSOD Capy. ⅝" x 6"

LEVELLERS—ROLLER
18" Torrington, 15 Rolls 2⅝" dia.
37" Torrington, 19 Rolls 1 21/32" dia.
42" Bliss, Nine Rolls 4½" dia.
66" Aetna 17 Rolls 4⅝" dia.

PLANER
72" x 72" x 16' Detrick & Harvey Four Head

PRESSES—HYDRAULIC
250 ton AECo. Straightening 4-Column, 16" Stroke, 67" x 35" Between Columns, 16' Long Bed
500 ton HPM Fastraverse, Bed 36" x 36"
1500 ton Bliss 15" Stroke, Bed 49" x 48"
1500 ton Mesta Steam Hydr. Forging Press
2400 ton Bliss 18" Stroke Bed Area 54"x 55"
4360 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESSES—STRAIGHT SIDE
180 ton Hamilton #847, 12" Str. 85½" Bet. Ups.
200 ton Clearing F1200-42, Stroke 30", Bed 44"x38"
250 ton Bliss #88 12" Str. Bed 29" x 29"
250 ton Bliss S1 7½" Str. Blstr. 33" x 39"

PRESSES—KNUCKLE JOINT
600 ton Clearing K-1600-36, 4" stroke, Bed 36"x36"
1500 ton Verson, 4" Stroke, Bed 48" x 48"

PUNCH & SHEAR COMBINATIONS
Cleveland Style EF, Arch Jaw Capy. 1¼" x 1"
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat, Architectural Jaw
#7 Kling, 72" Throat, With Thomas Duplicator

ROLLING MILLS
6' x 5" Torrington Wire Flattening Mill Line
8" x 10" Schmitz Single Stand Two High
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Single Stand Two High
20" x 36" Single Stand Two High

ROLLS—PLATE STRAIGHTENING
108" Bertsch, Seven Rolls 9" Dia.
72" Niles, 7 Rolls 9" Dia. Motor Driven

SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"

SHEARS—GATE
6' x 1" Hilles & Jones #6
12' x ⅜" Niagara Model 1212, NEW 1951

SHEAR LINES
36" x .020 Ga. Hallden Shear Line
53" x ⅜" Heavy Duty Shear Line
60 x 7 Ga. Shear Line
96" x 14 Ga. Cleveland Shear Line

SHEARS—SQUARING
6' x 10 Ga. Niagara No. 672
10' x ¼" Cincinnati #1810
10' x ⅜" Cincinnati #2510

SHEARS—ANGLE
6 x 6 x ⅝" Hilles & Jones
4 x 4 x ⅝" Long Allstatter

SLITTERS
24" Yoder Slitting Line
36" Paxon Slitting Line

STRAIGHTENERS
No. 3 Medart 3 Roll, Capacity to 4½" Tubing
12 Roll Aetna Standard, Capacity 2¾ O.D.
No. 0A Medart 2-Roll, Capacity ⅛" to 1" Bars

SWAGING MACHINE
#6½A Fenn, Capacity 3⅝" Tube, 1¼" Solid. 16" Die Length Hydraulic Feed, LATE

WIRE MACHINERY
New England Butt Co. 4-Bobbin Planetary cablers Model X-30A, Robbin Size 16" x 19½"
Vaughn Wire Drawing Machine. 4 Blocks 22" Dia. Complete elect. equip. for each block

TOTAL OF 17,500-KW IN M.G. SETS

5—3500-KW, 3 Unit, Allis-Chalmers, Motor Generator Sets. Each consisting of:
2—1750-KW, 250/350 Volts parallel, 500/700 Volt series, 514 RPM, 5000 Amp., type HCC, rated continuous at 40 Deg. C. Allis-Chalmers DC Generators with Class B Insulation, separately excited, direct connected in the center to:
1—5000-H, 3730-KW, 13800 Volts (6900 volts), 3 Phase, 60 cycle, 514 RPM, 162 Amps., Allis-Chalmers Synchronous Motor with Class B Insulation, rated continuous at 40 Deg. C. Rise.
Each set equipped with a 40-KW exciter for synchronous motor fields, and a 10-KW exciter for generator fields, both 250-VDC at 514 RPM.
All mounted on a structural steel base approximately 27' long x 11' wide.
These units are of the very latest type and design—condition excellent—were used only a short time—AC and DC Switchgear available. For any additional information and price, please contact one of the following dealers closest to you:

T. B. McCabe Company
4300 Clarissa Street, Philadelphia 40, Pa.
Morhead Electrical Machinery Co.
120 Noblestown Road, Oakdale (Pittsburgh District) Pennsylvania
Brazos Engineering Co., Inc.
P. O. Box 9114, Houston, Texas
Duquesne Electric & Mfg. Co.
6428 Hamilton Avenue, Pittsburgh 6, Pa.

BENKART STEEL & SUPPLY COMPANY

CORAOPOLIS, PENNSYLVANIA
AMherst 4-1250
Dealers in new and used OET Cranes and Structural Steel Buildings.
Send us your inquiries.

NEW STEEL

ORIGINAL BUNDLES

(Slightly Rusty)

Description	Length	Weight Pounds
3/16 x 2¾ H.R. Strip	10'	20,000
1½ x 2 H.R. Flat Bar C1015	18'-20'	18,000
5/16 x 4½ H.R. Flat Bar C1015	18'-20'	30,000
½ x 8½ H. R. Flat Bar C1015	8'4"	13,000
2½ x 1½ x 5/16 H.R. Angle C1015	15'2"	20,000
⅜ H.R. Sq. C1012-C1020	18'-20'	1,800
3/16 x 3 H.R. Strip	15'	1,000
3/16 x 3½ H.R. Strip	14'	35,000
3/16 x 5 H.R. Strip, Mill Edge, P&O	8	5,000
7/16 x 7½ H.R. Plate C1015	10'	40,000
2 x 2 x ¼ H.R. Tee C1015	15'	80,000
3¼ x .160 Flat Iron C1010	10'	6,600
3½ x .135 Flat Iron C1010	10'	1,840

ALL NEW STEEL

ORIGINAL BUNDLES

(Not Rusty)

Description	Length	Weight Pounds
1 7/16 Tool Steel Silico Mang. Shock Resisting	12'	12,000
3/32 x 1 Spring Steel—Annealed C1095		1,000
⅝ Tool Steel Silico Mang. Shock Resisting	12'	7,000
¾ Dia. C.D. Bar C1045	20'	1,700
2⅞ Dia. H.R. Bar C1045	20'	552
⅛ x ⅝ C.D. Flat C1018	14'6"	20,000
⅜ x 2¼ H.R. Flat Bar C1015 P&O	17'	25,000

MILLER JUNK & WASTE CO.

220 Hazel Street Lancaster, Pa.
Phone-Express 7-5984

LATE MODEL SAWS

10" x 10" MARVEL ⌯9A-1, Auto feed, 1952.
18" x 18" MARVEL ⌯18, 24" load track, 1940.
⌯213 CAMPBELL WET ABRASIVE, 3½" tubes, or 2" rds, 7½ H.P. New 1945.
COMPLETE EQUIPMENT, 3/60/220/440 MOTORS.
WILLIAMS MACHINERY COMPANY
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OVERHEAD ELECTRIC CRANE

15 - ton capacity — Shepard — 75 - foot span — 300 - foot runway — 28 - foot lift
Harry Goldberg & Sons
Perth Amboy, N.J. Phone HIllcrest 2-6500

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A graduate Mechanical Engineer is needed to fill a permanent position in our Plant Engineering Department at Fontana.

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If your qualifications meet these requirements, send complete resume with salary requirements to

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College graduate, Southern background, minimum 5 years' experience sales department major steel pipe manufacturer, line pipe experience necessary, under 40 years old, extensive travel necessary, opportunity for rapid advancement after proving ability with rapidly growing company, salary plus commission, substantial earnings possible. **Write K. S. Bayless, Aluminum Tubing Company, P. O. Box 1234, Jacksonville, Florida.**

Metallurgical Engineers

With experience in investigation and analysis of mechanical failures, shop methods, processes and devices employed in the manufacture of parts for heavy duty earth-moving equipment; and metallurgical and heat-treating studies to evaluate materials, chemical properties and heat-treating specifications based on analyses of service performance.

THE EIMCO CORPORATION
P. O. Box 300, Salt Lake City 10, Utah

Steel Mill Superintendent for small plant consisting of electric furnace and Merchant Mill. Must have experience all phases. Southern location. Give complete account of experience, references and salary anticipated.

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CLASSIFIED SECTION

Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

Lustre-Die Takes High Polish For Molding Plastic Rattles

Shreve Molded Products, Youngstown, Ohio, needed an injection mold for the production of heart-shaped parts for baby rattles, using acetate and styrene plastics. They wanted a mold capable of taking a high polish, so as to produce unusually attractive parts. In addition, the mold had to have the stamina to perform economically during long production runs.

The problem was put up to Leed Steel Co., Buffalo, N. Y., Bethlehem's local tool steel distributor. Their recommendation was Lustre-Die tool steel. It proved to be an excellent choice, too, for the mold, which was produced by Tri-Penn Tool Co., Erie, Pa., has been satisfactory in every way.

Lustre-Die is ideal tool steel for producing plastic parts because its properties enable it to take an unbelievably bright, mirror-like polish. Not only does Lustre-Die have the proper basic analysis for working with plastics—we even go a step beyond that by adding alloy fortification. We also build up the steel's excellent properties by oil-quenching and tempering, so that it can be furnished ready for machining and polishing.

Lustre-Die is made in the electric furnace, and is carefully inspected to insure cleanliness. It has a minimum of inclusion-causing additions. Besides, modern inspection methods hold injurious porosity to the minimum.

If you have any questions about Lustre-Die, or if you would like to give it a trial run, your Bethlehem tool steel distributor will be pleased to assist you.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

It Pays to Keep Tools Sharp

In many shops, resharpening of production cutting tools is sadly neglected. In an effort to keep output high, too many tools are kept in use beyond the point where the cutting edges become excessively dull.

What happens when edges are dull? The dull edges cause an increase in the service load of the shearing or cutting operation. If the dullness is carried to extremes, tools break. Dull edges also produce rough surfaces on the parts, which may lead to rejections due to defects, or because the permissible tolerances have been exceeded.

Should resharpening be delayed too long, it may be impossible to recondition a tool properly, as deep spalls, cracks and gouges cannot be removed. Usually there is an economic balance point where it is best to resharpen, and for each operation this should be determined in advance. Tools should also be inspected regularly, to prevent excessive dulling. Intelligent use of preventive maintenance of cutting edges can work wonders in providing longer tool life and fewer broken tools.

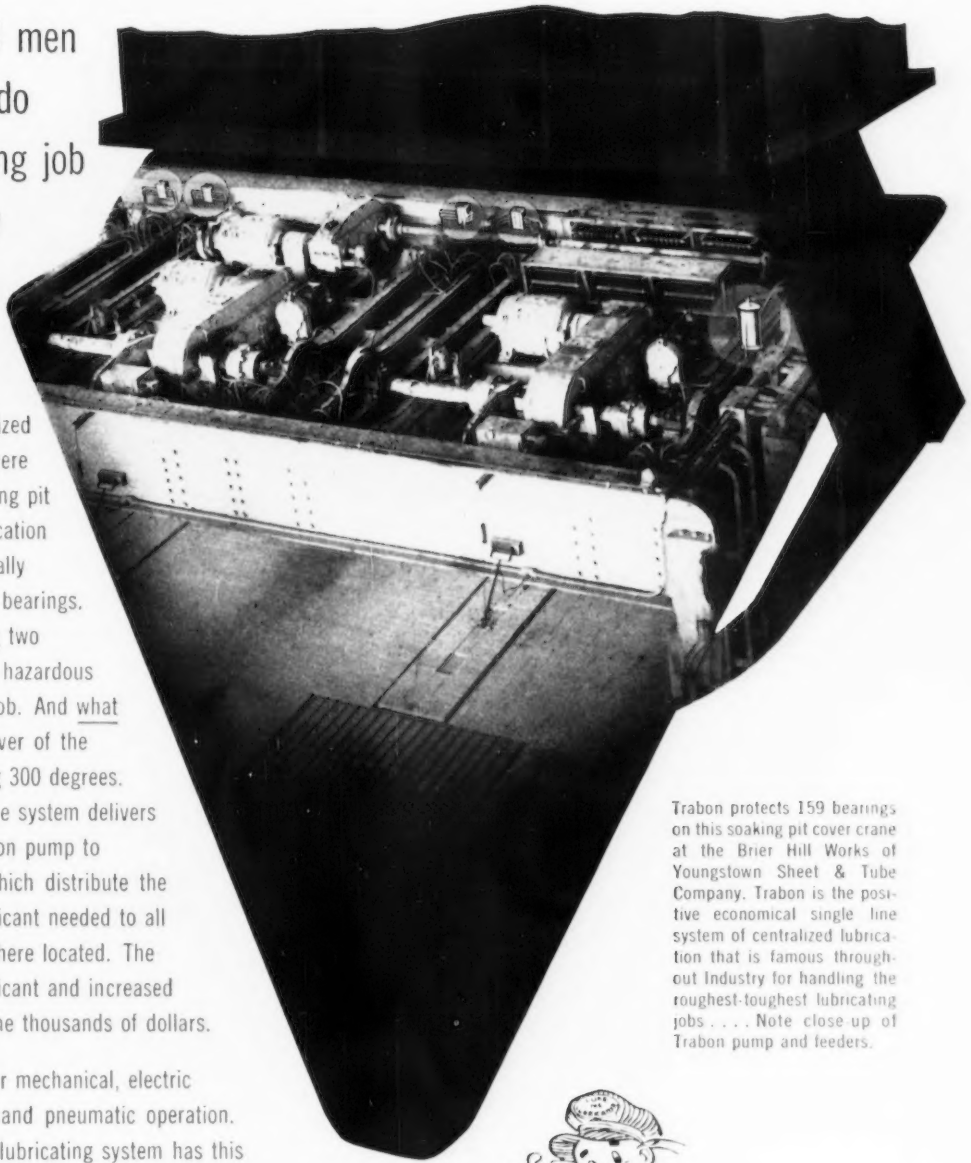
Bearcat Puts Square Holes in ½-in. Plate

In this operation, photographed at Frink Sno-Plows, Inc., Clayton, N. Y., Bethlehem Bearcat is putting 11/16-in. square holes in carbon-steel plate, used as cutting edge of snow plows. Though the steel plate is 1/2 in. thick, the average life of each punch is 5500 holes.

TRABON

CENTRALIZED LUBRICATING SYSTEMS

It took 3 men two days to do the lubricating job Trabon now does in 5 minutes!



Before Trabon Centralized Lubricating Systems were installed on this soaking pit cover crane, the lubrication had to be done manually to protect 159 critical bearings. It took 3 men working two days under extremely hazardous conditions to do the job. And what a job with the top cover of the soaking pit registering 300 degrees. Now, a Trabon positive system delivers lubricant from a Trabon pump to progressive feeders which distribute the exact amount of lubricant needed to all bearings no matter where located. The savings in labor, lubricant and increased production run into the thousands of dollars.

Trabon protects 159 bearings on this soaking pit cover crane at the Brier Hill Works of Youngstown Sheet & Tube Company. Trabon is the positive economical single line system of centralized lubrication that is famous throughout Industry for handling the roughest-toughest lubricating jobs . . . . Note close up of Trabon pump and feeders.

Trabon is designed for mechanical, electric motorized, hydraulic, and pneumatic operation. No other centralized lubricating system has this versatility without needing expensive auxiliary machinery. Learn for yourself why Trabon usually is entrusted with Industry's roughest-toughest lubricating jobs. Write for specifications and literature — today!

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Proper electric motor performance is the very heart of air conditioning and the leading manufacturers of such equipment, from small window-installed units to complete systems for huge buildings, use and recommend Cutler-Hammer Motor Control.

Electric motors and the control equipment which must direct and protect them have an astounding variety of jobs to do today. Modern aircraft and steel mills, for example, are poles apart in their needs. So are machine tools and air conditioning systems, sewage disposal plants and automobile assembly lines, oil well pumping and newspaper press drives. Each requires its own highly specialized control techniques and often control equipment just as highly specialized.

For sixty-five years Cutler-Hammer engineers have worked with the technical men of *all* industries on the specialized needs in motor control. In industry after industry they have been in the forefront of progress for decades, forever ahead with the leaders. It is logical that Cutler-Hammer Motor Control is so frequently the specified choice of both designers and users of specialized equipment where dependable performance is so important! And it is also most logical that you will find it pays to specify and insist on Cutler-Hammer whenever you order control.

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